IUFRO

A History of IUFRO Congresses, Forest Research and Russia's Participation

By

Victor K. Teplyakov & Valentin S. Shalaev

Translation of the second Russian edition

John A. Parrotta & Priya Parrotta Natarajan, Editors

National Institute of Forest Science

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This monograph is a history of the establishment, major developments and Congresses of the International Union of Forest Research Organizations (IUFRO), and the participation of Russian forest scientists, researchers, managers and specialists in IUFRO activities. Interesting facts and previously unpublished documents and photographs are presented. The book is targeted to university and post-graduate students, teachers, professors, researchers, scientists, forest sector administrators, as well as to those interested in the history of the forest sector in Russia and the world, the development of forest science, international relations and scientific organizations.

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Foreword

As former President of IUFRO, I would like to commend the efforts of Russia through the leadership of Professor Victor K. Teplyakov and Professor Valentin S. Shalaev in writing this book on the 'History of IUFRO Congresses and Russia'. This book was published originally in Russian in 2014. However, some former presidents of IUFRO requested to have a copy of this in English version. Thus, I proposed the publication of this English version of that book to the National Institute of Forest Science (NIFoS; former Korea Forest Research Institute), Republic of Korea who gladly expressed their support in this undertaking. For this, high appreciation is given to the NIFoS.

Forests play a crucial role for all peoples in the world and they are important natural resources providing various benefits to people. Russia is a country with large forest area accounting for about 20 percent of the global forest cover and 49 percent of the global boreal and temperate forests. It has more than 17 million hectares of planted forests. The area of forest is stable, making the Russian forestry significant not only at the national level but also at the global level. Therefore, there is a need to manage them properly to achieve sustainable forest management. While there are lots of issues affecting our forests, it should remind us all that the context surrounding forest research and its management is evolving and changing constantly.

IUFRO as the global network for forest science cooperation has a mission is to promote global cooperation in forest-related research and to enhance the understanding of the ecological, economic and social aspects of forests and trees; as well as to disseminate scientific knowledge to stakeholders and decision-makers and to contribute to forest policy and on-the-ground forest management.

Hence, IUFRO in cooperation with Swiss Agency for the Environment, Forests and Landscape (SAEFL) has been able to launch together the GFIS-Russia project with the objectives of providing access to forest related information resources available on the internet in order to support sustainable forest management in Russia. IUFRO was able to facilitate as well exchange of knowledge and experience among the forest community, universities, state forest research institutes, Russian Academy of Sciences, and NGOs. Furthermore, IUFRO helps promote information about forest, forest related sciences and forest education in Russia and create networks and partnerships between Russia and other countries and international organizations.

On the other hand, the IUFRO World Congress since 1893 has come a long way of uniting various forest researchers by convening in different continents of the world. The IUFRO World Congress, held at 4-5-year intervals, is one of the largest global forest events attended by thousands of participants, bringing together scientists and stakeholders from all parts of the world to discuss scientific and technical issues related to priority areas of forest research, policy and management. I am glad that the IUFRO World Congress up to present is very much alive and has enthusiastically encouraged developing countries and young people globally.

Congratulations for this endeavour and may we continue to do research for the benefits of forests and people.

Professor Don Koo LEE
President of IUFRO, 2006-2010

Preface to the 2nd Edition in Russian

For a fairly long time, scientists from the Moscow Forest Engineering Institute (now the Moscow State Forest University) have been cooperating with the International Union of Forest Research Organizations (IUFRO), one of the oldest and most reputable international alliances. The names of such well-known representatives of our University as Academicians V.N. Sukachev (1944-1948)[1], N.P. Anuchin (1944-1984), S.S. Sobolev (1949-1980), I.S. Melekhov (1962–1992), N.A. Moiseev, Professors N.P. Kobranov (1924-1925), A.N. Oblivin, V.K. Teplyakov, V.S. Shalaev, and A.N. Filipchuk have been referred to in formal and informal documents of IUFRO since long ago. Our scientists have been also traditionally and fruitfully performing various administrative functions in IUFRO.

In 1990, the Moscow Forest Engineering Institute officially joined IUFRO as an institution and that step gave an additional impetus to the development of our cooperation. It was the third Higher Education Institution and the first of Soviet HEIs, which joined IUFRO. Moreover, in 2001, the initiative of the Moscow State Forest University resulted in the decision to establish the Association of Russian IUFRO Member Institutions under the leadership of our University. Since that time, we have been coordinating and consolidating activities of Russian organizations in IUFRO. We also put in place and are maintained a website and are offering various events and activities to attract new IUFRO members.

There were periods when up to 15 Russian organizations participated in IUFRO work. Those were: the Institute of Forest named after V.N. Sukachev (under the Siberian Branch of the Russian Academy of Sciences), Russian Research Institute of Silviculture and Forestry Mechanization (VNIILM), Moscow State Forest University, Russian Institute of Continuous Education in Forestry (VIPKLKh), Russian Research and Information Centre for Forest Resources, Research Institute of Forest Genetics and Breeding, St. Petersburg Forest Technical Academy, St. Petersburg Forestry Research Institute, Volga University of Technology, Siberian University of Technology, Ural University of Forest Technology, the CIS Office of the World Conservation Union (IUCN), *Healthy Forest* Non-Commercial Partnership/Strategic Alliance, Institute of Biology and Soil Science (under the Far East Branch of the Russian Academy of Sciences), Forest Engineering Department of the Petrozavodsk University. It is also noteworthy that the universities featured the highest representation among the above organizations.

In recognition of the important roles IUFRO and its leaders played in the global forest research community, the title of the *Honourable Doctor of the Moscow State Forest University* was awarded to Mr. Ristio Seppala (Finland), IUFRO President (2001-2005), in 2001; Mr. Don Koo Lee (Republic of Korea), IUFRO President (2006–2010), in 2007, and Mr. Niels Elers Koch (Denmark), IUFRO President (2010–2014), in 2010.

The international forest community attaches great importance to the efforts to put in place and make operational the Russian Segment of the Global Forest Information Service (GFIS), as well as to 'fill' and improve it. The idea to launch the GFIS-Russia project was discussed by the Association of Russian IUFRO Member Institutions for several years. It could not be promptly implemented due to lack of unity among forest research organizations, subordinated to different agencies. Only in 2005, the GFIS-Russia framework was finally identified; and a Task Force was established to maintain it. The university component of the GFIS-Russia project was to consist of

[1] The figures in brackets are the years of their work in the Institute/University.

all the higher education institutions of the country, included in the Educational Resource Association for Forestry, and to be led by the Moscow State Forest University.

The academic research component of the GFIS-Russia project was to be represented by the Institute of Forest named after V.N. Sukachev (under the Siberian Branch of the Russian Academy of Sciences), Institute of Silviculture (the Russian Academy of Sciences), Centre for Ecology and Forest Productivity (the Russian Academy of Sciences), Institute of Forest of the Karelian Research Centre (the Russian Academy of Sciences) and other research facilities of various branches and research centres of the Russian Academy of Sciences. This component of the project to develop a GFIS-Russia pilot version was headed by the Institute of Forests of the Siberian Branch of the Russian Academy of Sciences. The sector-specific (applied) research component of the GFIS-Russia project was to be represented by research institutions and planning and design organizations, subordinated to the Russian forest agency, and to be headed by VNIILM. In view of the fact that the Moscow State Forest University was the initiator of the project and had certain comparative advantages, it was decided to implement the GFIS-Russia project under the leadership of the Moscow State Forest University, and this decision was supported by all project participants.

So, in 2006, the IUFRO management endorsed the initiative to launch such a project, with respective commitments made by the Russian counterparts to develop a GFIS-Russia pilot version, and the planned activities were completed. In 2007–2014, the work continued, primarily in the Moscow State Forest University, to fill and develop the gfis.ru Internet portal which was the Russian language part of the Global Forest Information Service. The results were presented at the following international conferences: *Forest as a Renewable Source of Vital Values for Changing World*, hosted by the Moscow State Forest University (2009), *Forest of Eurasia – Polish Forests* held in Poland (2009), *Forestry: Bridge to the Future*, held in Bulgaria (2010), the XXIII and XXIV IUFRO World Congresses, held respectively in the Republic of Korea (2010) and the USA (2014).

Presenting this second edition, it is worthwhile to note that the forest research community (both in Russia and abroad) is keen to have this book published. In particular, during the XXIV IUFRO World Congress in Salt Lake City, many IUFRO leaders and officers stressed the uniqueness of this book and deemed it important to publish it also in the English language which is undertaken now.

Professor Victor G. Sanaev
Rector, Moscow State Forest University

Editors' Preface to the English Translation of the 2nd Russian Edition

In this extraordinary volume, our esteemed colleagues Professors Victor K. Teplyakov and Valentin S. Shalaev have carefully tracked the development of international forest science collaboration since the late 19th century through the lens of IUFRO's evolution. Tracing IUFRO's modest origins in Germany, Austria and Switzerland 125 years ago, to its present status as the global network for forest science cooperation, this meticulously researched work draws on a wealth of publications and archival material. It provides the reader not only with a comprehensive timeline of IUFRO's history, but also insiders' views of the events, issues and motivations that shaped the work of several generations of forest scientists who devoted their careers – and in some cases their lives – to further the ideals of international cooperation embodied in IUFRO since its establishment in 1892. While focusing largely on the 24 IUFRO World Congresses held between 1893 and 2014, the book also provides a fascinating and well-documented history of forestry and forest science in Russia since the late 18th century, and of the leading personalities and important contributions that Russian forest scientists, universities and research organizations have made to IUFRO since its very earliest years.

The authors deserve our sincere appreciation for this unique and monumental work, which was first published in Russian in 2014. This English translation - while remaining true to the original – has been modified in terms of the structure of its major sections and numbers of chapters contained therein. The authors, and editors, believe that these changes provide a better balance and organization of topics that will appeal to a broader international readership.

John A. Parrotta and Priya Parrotta Natarajan
Editors

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The authors

Clarifications and Introductory Remarks

The authors would like to provide some clarifications regarding the contents and preparation of this book:

Sources. In Russia, there are very few IUFRO Congress Reports available, and virtually none of these have been translated into Russian. Unfortunately, no library in the world has a comprehensive collection of papers from all the IUFRO Congresses. For this reason, copies of most papers (with some of them preserved in single copies) were collected from almost 20 libraries of research institutes and universities across the world and from the IUFRO Secretariat in Vienna. In view of the fact that Russian readers have no access to information about most of the IUFRO Congresses, particularly those held before the mid-20th century, the authors felt it necessary to present more comprehensive information about those Congresses compared with those held during the past three decades. We also wanted to stress the historical value of the early Congresses, to show the level of forest research at that time, enable readers to feel its spirit, manner of holding meetings and discussions, and demonstrate specifics of other aspects.

Dating of data sources. To avoid confusion between the dates of the Congresses and the dates of publications about them, the references to the dates in brackets are provided to show the years of the Congresses, e.g., IUFRO (1896) though the report about that Congress was published in 1897, or IUFRO (1956) though the Congress report was published in 1958.

Languages of publications. Most documents were published in English, French and German, the three official IUFRO languages until 1990. As regards texts in German, until the mid-1950s they were printed in Fraktur (Old German font, in Russian also called "Gothic"), and manuscripts were often prepared, using the Sütterlin font. Certainly, it added difficulties to our work. The authors also used some documents in Italian, Polish, Spainish and other languages as well as information about the IUFRO Congresses written in Russian, including those prepared by participants.

Method. The authors present the information chronologically based on published proceedings of the Congresses and articles of their participants in peer reviewed journals which are the primary sources, in such cases. Selected aspects were specified, using numerous thematic interpretations of issues, discussed at the Congresses (e.g., bibliography, seed progeny, provenance tests, thinning, forest pest management, etc.) as well as overviews or reviews, coupled with secondary sources (comments, announcements, etc.).

Translations of the words to denote a Congress. Some picture captions from reports and proceedings of the Congresses are presented in translations which may differ from the official names of the organizations of that time. For example, in a Congress Report, the International Union of Forest Experiment Stations might be translated from German into a modern language as the International Union of Forest Research Institutes. Some Congresses were referred to as a Meeting, Assembly, Congress or World Congress.

Translation of names and geographical denominations. In the Russian text, practically all personal names and geographical denominations are accompanied with respective names in the original languages (in the Latin spelling) to avoid potential conflict of translations from different languages.

Biological nomenclature. The authors tried to give Latin/scientific names for the mentioned species of trees, insects, fungi, diseases, etc. wherever it was possible.

Specific difficulties. The authors tried their best to observe generally accepted rules of presenting data on each of the IUFRO Congresses, i.e., to show its opening and closing dates, the number of participants, the number of presented papers and offered excursions, etc. Nevertheless, it should be noted that there are many discrepancies in these data. E.g., for some Congresses, the number of participants/delegates includes spouses or relatives while for other ones, they are not included; the duration of the event may or may not include excursions before, during or after the Congress; the duration is also indicated, including or excluding the day of the first meeting (welcome dinner), etc.

Structure. Until recently, the contents of IUFRO Congress Reports were not structured because each next Congress took place in a country with a different culture of routine work, a different leadership style of the new President or his team, etc. Bearing in mind that the main goal of any Congress is to share information, opinions, and achievements in different areas, to have scientific discussions of presented papers and to demonstrate experiments in the field (excursions), the authors are describing each Congress on this basis. Organizational issues (function of the elected bodies, statutory arrangements, structure, resolutions, etc.) are described as additional data to provide a broader picture of IUFRO's activities during a long period of time.

Participation of Russian/Soviet specialists is given a central place in this study; however, it is incorporated in the context of each period and each Congress. In addition, we are providing some facts which may show a Congress from another perspective or be of interest for a specific training or research discipline. Therefore, we tried to strike a balance in presenting information about each Congress, using the following pattern: a general part (what, where, when, how many, etc.), research agenda and excursions, organizational aspects and resolutions as well as participation of Russian/Soviet scientists and to trace, if possible, contributions from our compatriots from the Russian Empire, the USSR (since 1922), and the Russian Federation (since 1991), living in other countries in that time, as well as to share other interesting facts.

* * *

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Introduction

Forests are one of the most important stabilizers of global natural phenomena. That is why research related to the interdependencies between the forest and the environment, and between the forest and the human beings has been IUFRO's cornerstone from the very beginning. Russia is the country with the richest forest resources in the world, and this defines its role and importance for forest science. Therefore, Russia plays a proper role in the international forest research community.

Forest science tends to be rather conservative because the forest growing process is very long – it takes several decades. Additionally, the postulates related to the growth and development of plants, with trees being the largest of them, are inviolable. It is for this reason that the laws of biology are called 'laws.'

Forest science embraces not only biology, but also technology. Technical and technological achievements of the last century, especially in its second half, resulted in substantial expansion of the scope of forest science. Prior, forest science was predominantly related to natural sciences (mathematics, physics, chemistry) and technology (ground and aerial photography, optical devices and tools for measurements, mechanical meters). During the last decades of the twentieth century space imagery, electronics, biotechnology and new work arrangements became important new elements of forest science.

Benefits of such novelties include increased labour productivity, improved precision of measurements as well as qualitative changes in research. Accordingly, the change affected forestry activities, forest management and economic parameters. Forestry developed along the line of comprehensive mechanization and automation, and involved the introduction of new technology and research and development outputs. Indeed, these days one can hardly imagine forest fire and pest management without the aerial and space monitoring, or forest nurseries without up-to-date machines and devices. Now, forest nurseries have greenhouses with controlled temperature, light and humidity. Such characteristics improve the efficiency of planting stock production and other activities.

Efforts to improve forest management do not recognize national borders, and it was not merely incidental that the United Nations declared the year of 2011 as the International Year of Forests. It was done in recognition of the vital importance of forests not only as part of the Nature, but also as a source of livelihood for people since ancient times. This UN declaration was also meant to pay tribute to foresters, scientists and specialists, i.e., custodians and explorers of the forest.

Changes of the national borders and boundaries of the forest vegetation and wildlife habitats, increasing pressures on forests from the growing human population and lots of other factors highlight the need for better coordination of efforts in practically all areas of human life. This is true at individual, community, country and continent levels. In this respect, Europe is a fine example of multicultural economies and aspirations for progress.

The Industrial Revolution (which had reportedly started in England in the second half of the eighteenth century) brought about fast deforestation due to the demand for timber to build houses, bridges, churches, fortresses, roads and mines. Generating energy and constructing merchant ships were also key priorities.

Forests, forestry and arboriculture figure in the lived and recorded histories of many countries, over the course of many centuries. In Europe, however, the interest in forest research developed only in the nineteenth century. The inception, evolution and formation of European and

global forest science are fairly comprehensively described in many publications of international and Russian authors. Initially, the bulk of forestry expertise and knowledge was concentrated in a few countries, including Germany, France, Russia and England (Арнольд, 1895). So, it is no wonder that the first international forest organization, currently known as IUFRO, was established in Germany and Austria in the late nineteenth century.

Historically, the International Union of Forest Research Organizations (IUFRO) is the second largest international voluntary non-governmental research organization to address global environmental issues[2].

Practically no Russian publications highlight the most meaningful IUFRO events such as symposia and Congresses. That said, about a dozen of articles, prepared by participants of the Congresses, have been written. Their authors are: G.F. Morozov, A.V. Tyurin, I.S. Melekhov, and N.A. Moiseev. Most of the proceedings of IUFRO Congresses are not accessible for Russian readers for many reasons. That is why this book is meant not only to provide an overview of the participation of Russia's representatives in the IUFRO Congresses, but also to increase the visibility of this internationally highly respected organization.

In preparing this publication, the authors faced expected problems with the translation of terms, names, and titles, as these have changed significantly in the past 100-130 years. Another problem was that some proceedings and other publications were available in a language other than their original language(s), for instance, when a paper was prepared in German, but only its English or French translation is available now. In the modern world, the authenticity of a translation may be fairly high, but when working with documents which are 100 years old, translations may be rather problematic to attain it. It was also difficult to address problems with the old fonts: many of the first reports were printed using Old German fonts: the *Deutsche Kurrentschrift* or 'broken' or *Fraktur* font, which made it difficult even for many German readers today to comprehend them.

Let us start with the name of the organization: IUFRO was established as an international organization at "*der Tagung des Vereins deutscher forstlicher Versuchsanstalten"*, i.e., the "*Meeting of the Association of German Forest Experiment Stations* [including participation of Austria and Switzerland]". At the first IUFRO Congress (Eberswalde 1892), this international organization was called: "*Internationaler Verband forstlicher Versuchsanstalten*" in German, and "*Union internationale des stations de recherches forestieres*" in French. This was translated into English as the "*International Union of Forest Experiment Stations*"[3].

As regards the translation from German into Russian, using the word "станции" (stations) or "институты" (institutes), it is worthwhile to have a look at one entry in the Encyclopedia by F.A. Brockhaus and I.A. Efron (Брокгауз и Ефрон, 1904, p.111) which reads:

> *Eberswalde (till 1877, it had been called Neustadt-Eberswalde) is a town in the Prussian Province of Brandenburg, located at a distance of 45 km north-east of Berlin, on the Finow Canal. Population: 18,288 (as of the year 1895). The Forest Academy with the Central Forest Experiment Station [underlined by the authors]. Three iron foundries; capacities to produce horseshoe nails, roofing, cement, bricks and sawn-wood; big railway shops. Chalybeate springs, a park and a bathing facility.*

The term "forest experiment station" was in use in Russian literature, indeed.

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[2] The first one is the World Meteorological Organization, established in 1873 http://www.wmo.int/pages/index_ru.html Accessed on June 15, 2014.

[3] The "*International Union of Forest Research Organizations*" is used since 1929.

It is noteworthy that translations of that time reflect the essence of existing notions. For instance, the modern Russian notion of *"forest experiment stations" (FES)* resembles the USA's Forest Experiment Stations. That said, in terms of importance and current functions, the American stations are comparable with research institutes.

In spite of such a broad range of modern interpretations, definitions or terms, it should be pointed out that in those times, translation was not such a critical issue because participants of those numerous meetings of forest scientists knew several languages and could communicate fairly well. Now, translations or interpretations (which are different things) play a substantial role. The importance of translation and interpretation to IUFRO's history and trajectory as an international organization was also reflected in the change in the English name of IUFRO (fortunately, the renaming did not affect the Russian name of the organization) from "...Forestry Organizations" into "...Forest Organizations". In this way, IUFRO opened its gates for research and other organizations not only from the forestry sector, but also from forest industries.

It should be noted that the "old" and "lexical" approach to translation conveys the spirit of that time. Clearly, 100 years ago, the notion of an institute was far narrower than today. The same is true of such notions as "experiment" and "research," which acquired new meanings from other linguistic, cultural and scientific standards in the course of their historical evolution. And the development of the common language of forest science was one of the roles that IUFRO has played, beginning with its institition, 125 years ago!

At this point, the authors would like to emphasize the following: Any starting point appears to be the most difficult stage. What we mean by this is that now, any forest student may learn from the textbook how to measure the height of trees on a slope, but more than a century ago, it was not so easy. At that time, there was no unified forest terminology which could be understood in different languages. People tried to borrow words from other languages directly or in slightly modified forms. To take one example: Currently, many foresters are trying to understand what is 'hidden' in the German words, denoting various forest cutting methods or silvicultural systems. Many old Russian textbooks are interspersed with such German names of forest cutting or silvicultural systems as *Dauerwald*, *Blendersaumschlag* or *Niederwaldwirschaft*, spelled in Russian[4].

Let us have a look at the development of forest science from a very prosaic angle, through the example of the use of measurement tools. At the meeting of the Forest Society in St. Petersburg on February 7, 1876, participants discussed the best tree callipers for forest mensuration and proposed to choose very specific instruments among numerous tools of that time (*Лесной журнал* 1876, с.101). The available instruments were so numerous and results of their use varied so much that their comparability could be discussed only with great caution.

In a library, forest specialists go to bookshelves, marked with Code 634.0 UDC (the Universal Decimal Classification) where forestry literature is to be found. Such a system for the forest sector emerged quite recently – about 50 years ago. But now it is so widely used that we perceive it as if it had been always here.

The same may be said about the history of forest science and of IUFRO. The pioneers in this field established an initiative to develop a common language of forest science. They also developed

[4] *Dauerwald* (German: *Dauer* means "continuance" and *Wald* means "forest") – continuously productive forest; continuous forest use. *Blendersaumschlag* (German: *blend* means "to harmonize", *blender* means "to mix", *Saum* means "fringe, strip, brim", *means "a portion, technique, cutting"*) = Wagner's method of strip selective cutting; harmonization of different cutting methods to produce one method which is the most suitable for a given tree stand/managed forest where trees are cut when they reach the maximum mean periodic increment and desired size with a seeded area left on the cutting site. It was proposed by H. Wanger, a German forester. *Niederwald*: German – *nieder* means "lower", and *Wald* means "forest" – broadleave woodland, managed coppice forest, vegetative grown and not seeded/planted.

international standards for collection and processing of data on forests, seed, cutting methods, wood properties or wood utilization. Without their efforts, we would be unable to have discussions today about forest diversity, or levels and methods of forest management. Then as now, it was necessary to have measurement tools and a common language to discuss issues on up-to-date agendas.

Russian scientists have made a great contribution into the world forest science in such areas as silviculture, forestry, forest mensuration, forest planning and inventory, forest fire and pest management, forest plantation and forest shelterbelt establishment, forest breeding and genetics, forest fire philosophy, forest entomology and forest disease control. They have also made significant contributions in related areas, including botany, zoology, meteorology, soil science, wood science, timber harvesting, wood-processing, mechanization of forest operations, remote sensing methods and simulations. In addition, Russia has greatly contributed not only to the development of forest science, but also to research in timber harvesting, wood-working, pulp and paper production and forest machine-building. Russia has been actively participating in IUFRO Congresses from the very beginning. This study is to demonstrate the participation of representatives from Russia in IUFRO.

The book intends to provide readers with an understanding of IUFRO's development. It does so by describing IUFRO Congresses, and by presenting the innovations and research breakthroughs which have been spearheaded by Russian scientists, foresters and specialists. The authors also hope that the offered study (the first study of this kind – no similar studies have been undertaken in other countries) will serve as a guide to IUFRO for interested readers.

Part One
IUFRO's Beginning

Chapter 1
Russia's Contribution to the Development of Forest Experimentation

About Forest Science in Russia in Brief

Initially, we did not intend to provide an overview of the historical dimensions of forest knowledge development in Russia; after all, they are fairly well-known and fully described in many Russian sources. However, for purposes of this study, it is worthwhile to highlight a number of multifaceted publications, relating to historical aspects of forest research and education. It is particularly important for us to have a look at the frameworks and roles of applied research in support of forest management in its numerous forms from a historical perspective.

Professor F.K. Arnold (1819-1902), an outstanding Russian forest scientist, educator, administrator and practitioner, was the author of one of the first and most comprehensive overviews of forestry in Russian. His work depicted the history of forestry in Germany, France and Russia. In particular, he described the settings for the emergence of the currently existing forest management, forest experimentation and forest education in the above countries. The late eighteenth and, especially, the early and middle nineteenth century saw vibrant development in the area of forest education and science. The number of forest education and training courses increased. These were delivered in universities and other schools, including forest schools, academies and institutes. The development of these courses was spurred on by rapid development in forest policies and forest management, as well as in the growth of forest-related publications associated with forests and forestry. Arnold noted that most forest schools provided their students with access to forested areas, where they could test and develop the theoretical knowledge they obtained in class. Such advances also meant that qualitative improvements in practical forest management were also taking place.

In addition, many private forest owners and government entities undertook various experiments in their forests. They tested different techniques for forest inventory and planning. F.K. Arnold's studies show the development of silviculture since its origin until the end of the nineteenth century (Арнольд 1895). They therefore offer an indispensable source of knowledge about silvicultural literature for research and training.

Professor I.S. Melekhov (1905-1994) is another great contributor to his generation's knowledge about the history of forestry in Russia. He wrote a seminal book which he modestly named "An essay." The book was dedicated to the interrelationship between Russian people and forests over time – from the medieval period to the present (Мелехов 1957). He wrote about the traditional knowledge of Russian people. He also wrote about M.V. Lomonosov's first scientific findings about forests and soils. These explorations served as a starting point to provide a wider overview of forest research in Russia. Melekhov also discussed the development of Russian

industries, sciences, publications and public activities related to forestry, up to the mid-twentieth century. He noted that Russian forest research had overcome numerous difficulties. In many respects, it emerged in the second part of the eighteenth century from the gained experience and successes in natural sciences, especially, in geography. Russian forestry at that time was associated with such prominent scientists and practitioners as M.V. Lomonosov, A.T. Bolotov, A.A. Nartov, S.P. Krasheninnikov, V.N. Tatischev, P.I. Rychkov and others (Teplyakov et al. 1998).

Russian scientists deserve honour for their contributions to the acquisition and appreciation of knowledge about forests. However, throughout the nineteenth century, there was an explicit reluctance in Russia to apply authentically Russian practices in silviculture, forestry and forest management in publicly-owned and private forests. Even today, educational literature persistently asserts that forest science had been 'made' exclusively in Western countries. This means that major domestic achievements in silviculture and forest sciences are to this day underestimated, and even obliterated. Nevertheless, by the mid-nineteenth century, Russian silviculture started to emerge from its undeserved obscurity. By that time, high-value experience had been accumulated in Russia.

Country-specific practical silviculture originated in the context of mining industry development, primarily, in the Urals. Experimental and research frameworks for steppe silviculture were established. The country created facilities for higher vocational education in forestry. Russian foresters published important research papers, basing on Russian experience; training literature on forestry became available; and the first forestry-specific periodicals were issued. The generalization and replication of best practices in silviculture were slowly progressing. Nevertheless, the domestic forest agency still preferred to draw from foreign "recipes" and scholastic schemes. They were often reluctant to refer to local site conditions for their insights.

The hard economic situation impeded the publication even of ordinary forestry-related books, to say nothing about forest periodicals. The *Lesnoy Zhurnal* (Forest Journal), published since 1832, ceased to exist by the end of 1851. Only some years later, it was replaced by the *Gazeta lesovodstva i okhoty* (Forest and game management newspaper), but its life was short – it lasted only until 1859. Later, in 1871, the St. Petersburg Forestry Society resumed the work of the *Lesnoy Zhurnal*, and since 1958, it has been issued as a part of the "Bulletin of Higher Educational Institutions". Thus, the situation was not conductive to broad promotion of Russian foresters' achievements. But even under such adverse conditions, our national silviculture developed and eventually acquired a solid scientific evidence basis (Мелехов 1957, pp. 62-63).

The most progressive Russian foresters strove to promote achievements of Russian forest science and management practices. Professor P.N. Verekha (1838-1917), for instance, prepared several literature indexes, and with Professor A.F. Rudzkiy (1838-1901), he developed a classified catalogue of books on silviculture, which prior to 1878 was published only in the Russian language. Their catalogue included 374 books (Верeха, Рудзкий 1878). Later (in 1888), the second edition was published under the title *Classified Catalogue of Books (Publications) on Silviculture, Available in the Russian Language and Published in the period of 1878-1888*. They also published the *Classified Catalogue of Forestry Articles, published during the fifty years in the Zhunal Ministerstva Gosudarstvennykh Imuschestv [Journal of the Ministry of State Properties]* (Верeха 1891).

As much as he could, Professor A.F. Rudzkiy also tried to publicize scientific achievements of that time through preparing forest handbooks or 'talks' about the protection and management of forests, and about forest cutting and timber sales (Рудзкий 1869, 1881).

At this point, it should be also noted that glossaries of forestry terminology started to be developed at this time. One of them was called the *Experience with the Glossary of Silvicultural Terminology* (Верeха 1898).

Some areas of silviculture emerged as a result of the efforts of Russian scientists. For

instance, the doctrine of species succession and forest types originated in the Russian North. This region provided abundant data for many unique efforts of Russian foresters, including those which addressed issues of forest harvesting and regeneration. At present, the global forest research community relies on Russian foresters' achievements in such areas as studies of virgin forests, roles of forests in the water balance and soil generation, and original methodologies of forest planting, cultivation, treatment and protection.

Russian forest management practitioners and scientists proved the feasibility of, and designed methodologies for, steppe afforestation. To provide one of numerous examples, we may refer to the following words of Professor I.S. Melekhov about Professor A.F. Rudzkiy: "Professor A.F. Rudzkiy was interested in steppe afforestation and intended to write a book about it jointly with F. Keppen. To that end, he requested a grant, amounting to 3,000 Roubles (RUR) from the Ministry of State Properties for the years 1883 and 1884 [*Архив АН СССР, ф. 92 оп. 1, № 6/*Archives of the USSR Academy of Sciences, Archive 92 Register 1, # 6], but he did not receive the money. In his request, Professor A.F. Rudzkiy emphasized that we should be proud of the attempts towards afforestation of Russian steppes, because they had been successful in spite of all arguments of prominent international scientists against the feasibility to grow forests in steppe; and Russian foresters had to undertake steppe afforestation efforts on their own because the experience of Western Europe turned out to be irrelevant [*Архив АН СССР, ф. 92, оп. 1, № 63*/Archives of the USSR Academy of Sciences, Archive 92, Register 1, # 63.]" (Мелехов 1957, pp. 74-75).

Forest planting in steppe remains ongoing until today. It is important to note that Academician I.S. Melekhov contributed into the development not only of Russian, but also of global forest science. He is the "founder" of many fields of forest research. In particular, he made a significant contribution into the exploration of forests in the European North – specifically, the development of taiga silviculture, as well as research on the nature of forest fires, fire-associated forest regeneration, and dependence of wood anatomy on the forest type. He is also the founder of forest pyrology. Forest pyrology is a doctrine which explains the nature of forest fires, forest fire incidence with due regard to forest types (fire occurrence scale), and fire consequences and management. Basing his work on the forest typology developed by Professor G.F. Morozov and Professor V.N. Sukachev, and on findings from assessments of cutover and burnt forest areas in the North, he developed a dynamic forest typology (Харин и др. 2005). Professor I.S. Melekhov was the author of university textbooks on such underlying disciplines as forest science and silviculture. These books have been published four times. His role in international cooperation was also highly praiseworthy. He headed Soviet delegations at many major international events (including IUFRO World Congresses and World Forestry Congresses), and made keynote addresses and important presentations as well.

Many Russian forest scientists and practitioners and the national forest service were keen to evaluate the role of Russian forest science in the global scientific progress. For instance, in the late 1890s, quite a voluminous historical review of silviculture development was prepared by Professor M.M. Orlov (Орлов 1896). Its follow-up studies were undertaken by Professor G.N. Vysotskiy and V.P. Dobrokhvalov (Доброхвалов 1950). Professor G.N. Vysotskiy described the establishment of forest plantations in experimental forest management units (*lesnichestvo)* in steppe. He also described the first results of experimental and pilot agroforestry operations (Высоцкий 1907, 1912).

In Russia, forest management planning is often based on the German classical approach. However, there was also a Russian approach, seeking and following its own way. The Russian approach focused on forest management and planning under the Soviet administration and socialist economy (Орлов 1912, 1929-1931).

As regards forest law and governance, it should be said that underlying studies were

conducted in Russia every fifteen to twenty years (Врангель 1841; Шелгунов 1857; Ведров 1878; Романовский 1881; Сабинин 1909; Фалеев 1912, etc.). Legal studies were often related to forest ownership, tenure and management (Vrangel, Vedrov). They sometimes embraced all aspects of the forestry legislation (Romanovskiy).

Russia had numerous achievements not only in forestry but also in timber harvesting, trade, sawmilling, wood-working, production of pulp and paper products, resin and forest chemicals as well as in the development of wood crafts. Improvements were attained in forest education, forest legislation, forest statistics; new civil society forest organizations were instituted; forest congresses were held on a regular basis (Лесная промышленность 1957).

The emergence of forest societies reflected the important role of forestry in the economy of the Russian State. It was expressed also in the emergence of new forestry-specific periodicals to highlight various aspects of forestry development, and in the establishment of higher and secondary vocational schools for forestry (Бейлин 1962).

Training Forest Management Units in the 19th - Early 20th Centuries

In the nineteenth century, Russian forest science was closely associated with the organization of forest training and experimentation in forest management units. The Forest Institute was opened in 1803, and its students came for practical (hands-on) training to the Lisino Forest Management Unit beginning in 1805. According to available sources, at the initiative of Mr. E.F. Kankrin, Minister of Finance, on December 1834, the highest authority of the country adopted the decision to establish the Lisino Training Forest Management Unit. The purpose of the Unit was to define and demonstrate good forest management. It was also intended to develop practical forestry skills through hand-on training of graduates of the Forest Institute and its associated first primary vocational school (Yager School). The Service of Forest Guards could thus be staffed with appropriately trained lower rank forest officers, and forest owners could find competent foresters more directly. The Forest Management Unit was resubordinated from the St. Petersburg Treasury Chamber to the St. Petersburg Forest Institute (Редько 2005, pp.149-150).

The initial impetus to develop forest experimentation in Russia thus originated from the need to provide students with both theoretical knowledge and applied skills. Professor I.S. Melekhov noted that the Lisino Forest Management Unit (FMU) was one of the oldest in the world. Futhermore, it managed to ensure continuity with activities of the Lisino Forest Allotment (*Lesnaya Dacha*) which aided research and training, in accordance with the ordinance survey of the year 1787 (Мелехов 1957, p. 126). The Lisino FMU provided testing grounds for experiments with cutting practices, drainage of waterlogged forest stands, drained land reforestation and many other forest management operations. It was there that Russian forest education and forest experimentation originated (Лисино 2009).

In 1903, the Forest Institute acquired the Okhta Forest Management Unit. There, in 1904-1905, A.N. Sobolev (1871-1911) and his assistant A.V. Fomichev undertook seed production studies. Their work yielded results of paramount value, which they described in their publication on seed production in forest stands (Соболев 1908).

This fundamental study is well-known not only in Russia but also abroad. Professor M.M. Orlov, one of the managers of the Okhta Forest Allotment, described issues of that time which remain relevant in our days. His publication about the Okhta Forest Allotment, managed by the St. Petersburg Forest Institute, was particularly significant (Орлов 1907). Such issues include forest inventory and planning with due regard to the forest type, site-specific forest management, pine and spruce growth and yield tables (by forest type and by site index). (Двухсотлетие 1998).

The Great Anadol Forest Management Unit was established in 1843 for the purposes of stand establishment in open steppe. It is now in the Ukraine. Its institution is associated with Count P.D. Kiselev (1788-1872), Minister of State Properties at the time. Kiselev visited the southern German communities in Russia, and took particular interest in their steppe afforestation attempts. He decided to involve Russian communities in those afforestation efforts, even though Russian settlers deemed it very difficult and unprofitable. In addition, Kiselev wished to prove the feasibility of open steppe afforestation in higher elevation terrains. Many had doubts about this feasibility because German colonists planted their woods primarily on sheltered lowlands. Kiselev also wished all work to be done by Russian settlers. He hoped to generate interest among the local population in afforestation efforts. He undertook various experiments with steppe afforestation to elaborate the most reliable steppe afforestation practices and find suitable forest species for that purpose. Lastly, he sought to ensure the adaption of various tree and shrub species in steppe, and mitigate, if possible, the steppe climate through afforestation of large areas (Собичевский 1892, с.759).

Established in 1865 in Moscow, the Peter Academy of Agriculture and Forestry[5] received an area of forest where training and experimentation processes were arranged. In 1862, (three years before the opening of the Academy), the stands within the Forest Allotment for Experimentation were surveyed for the first time by A.R. Vargas de Bedemar, a well-known forest enumeration expert (1816-1902). This Experimental Forest Allotment was used as testing grounds where Professors V.T. Sobichevskiy (1838-1913), M.K. Turskiy (1840-1899), N.S. Nesterov (1860-1926), G.R. Eitingen (1889-1959) and V.P. Timofeev (1892-1981) from the Academy established silvicultural, forest hydrology, and forest plantation experiments. They applied unique methodologies and provided unique monitoring opportunities, made possible by long observations (Васильев, Поляков, Савельев 1999).

This Forest Allotment for Experimentation was able to identify and address many problems in silviculture and forestry. In 1878-1881, M.K. Turskiy conducted his well-known studies which provided a basis for the development of the photophilic scale for tree species.

In 1882-1912, M.K. Turskiy and N.S. Nesterov (1860-1926) established the first Russian pine plantations with various density levels as well as pine and spruce plantations, using seeds of different provenances.

In 1907-1913, N.S. Nesterov became the first person in Russia to assess the impact of forest on the wind power and direction, microclimate in forests and open spaces. He empirically measured the wind velocity in front, inside and behind the forest. Nesterov also found the windbreak effect in the vicinity of windward forest borders and windspeed reductions near the leeward side. That study became a classic and was included in many textbooks on silviculture. The findings were used to design activities to establish forest shelterbelts along railways and highways, and, then, shelterbelts to protect agricultural fields. Over 400 publications were prepared on the basis of research findings and outputs from that Forest Experimentation Allotment (Васильев, Поляков и Савельев 1999).

Professor V.V. Dokuchaev's Special Expedition and Forest Experimentation

In the summer of 1891, Russia experienced a severe drought. Seventeen provinces of its Black Soil and Middle Volga regions suffered most of all, and in other six provinces, the most affected households received grain, food and monetary loans. According to calculations made by the the Central Statistics Committee (ЦСК 1894, p.1), the total population of those 23 provinces affected by the drought of 1891 amounted to 38 million people, of whom 39%, or 13.1 million,

[5] Later, it was renamed into the K.A.Timiryazev Academy of Agriculture, and now, it is called the Russian State Agrarian University named after K.A. Timiryazev.

needed help. In the Kazan, Nizhniy Novgorod, Penza, Saratov and Tambov Provinces the share those in need was up to half of the population, and in the Simbirsk Province, it was as large as two-thirds of the total population (ЦСК 1894, p.7).

Crop failures and famines occurred rather often in European Russia: the 18th century saw 34 crop failures, and in the first half of the 19th century alone, there were 35 crop failures at regular intervals (every 6-7 years, and with 2-year duration). The most severe famines of the second part of the 19th century were caused by crop failures in 1873, 1880 and 1883. In 1891-1892, the famine affected 16 provinces in European Russia (and the Tobolsk Province) – with a total population of 35 million people. Famines also affected other areas, but with lower intensity, in 1892-1893 (Брокгауз и Ефрон 1893, p.104). Only two particularly lean years - 1833 and 1840 – are comparable with the year 1891 in terms of the area of failed crops (Ермолов 1892, p.4).

The crop failure of the year 1891 was caused by extreme drought and a broad range of other adverse phenomena in the autumn and winter of 1890, and the spring and summer of 1892 (Ермолов 1892, p. 3). The adverse weather factors included snowfall on frozen soil and blowout of the snow. When the snow melted, the meltwater was immediately absorbed by the dry soil, and in the absence of spring floods, the flood plains could not be fertilized with river mud. Further the heavy rains and late spring cold periods killed young sprouts, and reseeded crops perished due to the awful heat. Not only crops but also weeds and even ancient (centenary) trees could not survive in such destructive weather conditions. The fields remained black, meadows were wilted or burned, and trees dried and perished (*ibid.*, p. 4).

Unlike the previous years of crop failures, these years were characterized by better preparedness of the government to counteract the situation. This was noted not only in official reports, but also by most eyewitnesses. Leo Tolstoy wrote that during those two months, there was no book, journal nor newspaper which did not contain articles about the famine, describing the situation of starving people, appealing for public or governmental help and reproaching the government and society for their indifference, sloth and apathy. But judging by newspaper reports of that time and Leo Tolstoy's personal impressions about the famine-relief efforts of the Tula Province Administration and local self-governance bodies, those reproaches were not fair. Indeed, the actions of the administration and community self-governance bodies were highly intense and enthusiastic. Vibrant and energetic activities were underway everywhere. In the highest administrative circles, non-stop activities were launched and implemented to prevent the forthcoming calamity. Money was made available and distributed to grant allowances and finance public works, and instructions were issued to supply fuel. In the affected provinces, Food Committees were established, emergency province-level and community-level meetings were convened; means to procure food were sought, data on peasants' situation were collected; aid resources were discussed and mobilized. Rye was provided for seeding, measures were taken to preserve oat seed for the spring, and, most importantly, for subsistence during the winter. In addition, donations were collected throughout the country through interest groups, churches; government officials deduced percentages from their salaries, donations were also collected in publisher houses, private individuals and institutions were making donations (Толстой 1954, pp.86-87).

The opinion that the country coped with that disaster comparatively easily was also expressed by N.S. Leskov in his novel (*Vale of Tears*). The novel emphasized that the whole country talked about the famine, and the government was the first to identify the problem. This responsiveness stands in contrast to the period 40-50 years before that, when crop failures had occurred but only Ministers and starving people had known about them (Лесков 1956, pp. 218, 219).

Another famous Russian and Ukrainian fiction writer (and keen observer), V.G. Korolenko, noticed the daunting signs: 'the Nature chased the Man with systematic mercilessness, inspiring a

superstitious idea of conscious purposefulness and vindication. The clergy kept on visiting fields to pray there, raising their icons up against the background of waterless scarce clouds in the hot sky. The Nizhniy Novgorod hills were continuously watching fire glimpses and smoke across the Volga River. The forests were burning all the summer, they ignited on their own; during the winter, the fire was hiding under fallen trees and was smouldering under the snow to wait for the next spring, to be released on the first dry days and go in flaming circles till the next winter. Once, fire columns above dense dark smoke sheet were seen from the City of Nizhniy Novgorod in the course of several weeks. In daytime, the smoke curled like a hazy sea, and at night, the picture resembled invisible arms, raising burning torches up to the sky...The famine was crawling towards us among that heat and smoke, among that drought' (Короленко 1955, p. 265).

Leo Tolstoy, meanwhile, stressed that the famine of the year 1891 was a predictable and preventable calamity (Толстой 1954, p.117).

In the summer and autumn of the year 1891, precipitation was distributed so unevenly that it appeared as if all the moisture had left the central and eastern parts of the country for its western and northern regions. It was as though an unprecedented upheaval occurred in the Nature to disrupt the normal weather conditions of those locations, and threatened to destroy the huge part of the country with the advancing heat and drought from the unfertile Central Asian steppes (Ермолов 1892).

It must be noted that the growing incidence of crop failures might be accounted for by many factors. Paradoxically, one of the most important of them was the abolition of serfdom in Russia in 1861. The liberation of the serfs gave rise to a chain reaction: landlords, deprived of their workforce, were unable to manage their lands under the conditions of hiring free workers. They started to sell large areas of their forests to be cut over. Uncontrolled forest logging led to deforestation of large areas. This was due to a lack of subsistence means and capital for forest management, as well as the difficulties of forest protection against illegal logging and great demand for timber to construct railways. Cutover areas were either tilled for crop cultivation or abandoned. New stands were not established, and the young regeneration was not protected against cattle grazing. It was widely recognized that the deforestation was so rapid in many areas that it started to affect the climate, causing shallowing of rivers and other water sources (Бейлин 1962, p. 60).

An ad hoc committee was established to address the threat. In 1872-1873, its members discussed the results of their work and noted that large areas of forests had been sold to be cut for any price. Cutovers might be made available for cattle grazing because this use generated at least some permanent income. There are no accurate data on the area of the forests, as only 26% of the government forests had been included in updated inventory data. By contrast, the rest of the government forests and all the private forests were described only in old plans or not described at all. The status of government forests, managed by peasants, was poor, with few exceptions. Most government forests consisted of stands, depleted due to overharvesting; and while the quality of the governmental forest management was poor in most cases, the management of private forests was still worse (*ibid.*, p. 60).

Forests are essential, reliable and true regulators of atmospheric waters and life of our streams, lakes and springs. According to Dokuchaev and Sibirtzev, in some places, the area of forests dramatically decreased, both in flood plain forests[6] (throughout southern Russia) and purely steppe forests. The forest steppe zone had once covered sands and even fine limestone soils on all riverside and ravine terrains. It stretched sometimes for dozens miles from the rivers, and its forests served a variety of purposes. They sheltered the ground to prevent water and wind erosion and vegetation from storms. They accumulated snow and shadowed the soil, retaining moisture in the soil and

[6] Forests, growing in river valleys (Докучаев В.В. 1936, p. 71).

elsewhere, and perhaps, contributing to the elevation of ground water horizons. Lastly, they protected springs, lakes and rivers from pollution, and increased the duration of spring high waters (Докучаев и Сибирцев 1894, p. 4).

In southern Russia and forest steppe in the Voronezh, Kursk, Orel, Tambov Provinces, the Ukraine, and Crimea, deforestation led to soil erosion, proliferation of gullies, depletion of water sources, and, consequently, reduction of streamflow (Цветков 1957). Thus, according to the most prevalent opinion of that time, the main cause of the drought was deforestation, and to be more precise, the eradication of forests to convert forest land into agricultural fields.

On April 4, 1888, a forest conservation law was adopted in response to concerns of foresters and civil society about the predatory destruction of forests. It was called the *Regulation on Forest Conservation* (Resolution on the Preservation of Forests) and covered practically all the forests in Russia. Special focus was given to forest shelterbelts along rivers, channels and roads, around water sources and cities, and in mountains. Province-level forest conservation committees, chaired by the Governors, were set up to monitor the forests and forest use and management of the shelterbelts.

The overall management of efforts to enforce the forest conservation law at the province level resided with the Forest Departmen. The Forest Department was part of the Ministry of Agriculture and State Property. As the name implies, that Ministry was responsible for agriculture, forestry and mining industry and State Properties. The forest conservation law not only gave the protection status to forests, but also put in place oversight arrangements to control private forests (Столетие 1892).

However, the taken measures failed to prevent the drought of 1891.

In mid-May 1891, Professor A.S. Ermolov (1847-1917) undertook a trip across south-eastern areas of Russia from the Voronezh Province to Saratov and Samara. His travels resulted in his book, titled *Our Crop Failures and Food Issue.* Published in 1892, the book was read by Czar Alexander III. As the result, in March 1893 A.S. Ermolov was appointed to act as the Minister of Agriculture and State Property. With his and E.S. Pisarev's support, the expedition of 1893-1899, led by V.V. Dokuchaev, was organized to identify the causes of periodically repeated droughts and crop failures in the Black Soil area in southern Russia, and to design appropriate response measures.

In May 1892, with a view to predicting and preventing such calamities, V.V. Dokuchaev (1846-1903) proposed to organize an expedition to the affected regions. He wished to identify the causes of the disaster and elaborate measures to prevent such events in future. At the same time, V.V. Dokuchaev pointed out that the disaster which struck us was not proportional to the crop failure, and that it was aggravated due to a broad range of other causes. Essentially, these other causes had nothing to do with the drought and crop failure of the year 1891 (Докучаев и Сибирцев 1894, p. 14). Soon after that proposal, on May 22, 1892, E.S. Pisarev (1837-1907), Director of the Forest Department of the Ministry of Agriculture and State Property convened a special meeting, The purpose of the meeting was to discss the possibility of launching afforestation operations, which would improve water management in steppes. The meeting's attendees decided to institute a special expedition for testing and recording of various practices and techniques of forest and water management in Russian steppes. Two weeks later, on June 5, 1892, E.S. Pisarev reported to M.N. Ostrovskiy (1827-1901), Minister of State Properties, with an explanatory note on the goal and operation plan of the Expedition (Филоненко 2000). In that note, he conveyed the following:

1. The ultimate goal of that expedition was to improve the site conditions for agriculture by improving the water management in the Russian steppe regions through various afforestation and irrigation operations.

2. Initially, three special-purpose areas (from 5,000 to 10,000 ha each) would be selected for the operation of the Expedition in the watersheds of the Volga/Don Rivers (in the Bobrov District of the Voronezh Province), Don/Donets Rivers (in the Starobelsk District of the Kharkov Province)

and Donets/Dnieper Rivers (in the Mariupol District of the Yekaterinoslav Province). In these areas, the Expedition would undertake preliminary assessments of the geological, soil and climatic conditions.

3. Then, drawing on plans, cost estimates and data from the above assessments, they intended to embark on the following operations within the areas: 1) gully and ravine control; 2) artificial afforestation of sands and hillocks; 3) construction of artificial ponds and water reservoirs; 4) snow retention through creation of live fences; and 5) protection of the river beds and banks against overgrowth through planting trees (Володин и др. 2007, p. 66-67). The Minister endorsed the plan of action, reported about it to the Czar and informed him about his desire to make Professor V.V. Dokuchaev the Team Leader for the Expedition. That document was signed personally by the Czar with the instruction "Be it accordingly" (Каштанов и Турусов 2011, p.16-17).

In June 1892, the Expedition commenced its work. Apart from V.V. Dokuchaev, it involved N.P.Adamov (1861-1912), V.D. Batyushkov (1868-1929), I.P. Vydrin (1867-1922), G.N. Vysotskiy (1865-1940), K.D. Glinka (1867-1927), P.A. Zemyatchenskiy (1856-1942), O.I. Kovalev (n.a.), I.K. Savich (1953-1913), N.M. Sibirtsev (1860-1900), K.E. Sobenevskiy (1867-1952), D. Shakhmetyev. In 1893-1894, the Expedition was joined or contributed to by P.F. Barakov (1858–1919), V.G. Deich, G.I. Tanfilyev (1857-1928), P.V. Ototzky (1866-1954), K.I. Yunitskiy (n.a.-1918). Forest rangers, land surveyors, meteorologists, and timber cruisers were also involved – 23 people in total (Докучаев и Сибирцев 1894, Беляев 2008).

In the late 19th century, the repeated crop failures made the Russian government think about how to combat droughts and, to some extent, how to cope with erosion (sands, gullies, black dust). As a result, a number of various special-purpose expeditions were organized. These included: Dokuchaev's Expedition, the Expedition of the Moscow Department; M.N. Annenkov's Expedition; and an Expedition to explore the sources of the main streams in European Russia under the leadership of General A.A. Tillo. The latter one started its investigations in 1894 and surveyed the basins of the Volga, Oka and Syzran Rivers (Володин и др. 2007, p. 72). In August 1892, after two months of the work by this Expedition, two weather stations were put in place and equipped in the Kamennaya Steppe. They were made operational right away to monitor the weather and understand the steppe climate. Indeed, they were the first Russian weather stations located outside cities. V.V. Dokuchatv's dream came true after many years of his efforts (Филоненко 2000).

That Expedition was a milestone in steppe afforestation based on forest shelterbelts. The Expedition established experiments in various geographical steppe areas: 1) the Khrenovskoy Area (Voronezh Oblast), including the Kamennaya Steppe, Khrenovskoy Pine Forest and Shipov Diciduous Forest; 2) Starobelsk Area (in the watershed of the Don/Donets Rivers in the Voroshilovgrad Oblast); and 3) Great Anadol Area (near the Azov Sea).

V.V. Dokuchaev himself led that Expedition from 1892 until 1897. The Expedition established a basic network of experimental forest management units, and this work was the starting point of this sort of forest experimentation in Russia. In the same years, N.K. Ghenko, a forester, began major experiments related to shelterbelt establishment in steppes – for instance, in the Bezenchuk steppe in the Samara (now – Kuibyshev) Oblast. G.I. Tanfilyev (1857-1928), a well-known geographer and botanist, student of A.N. Beketov and participant of V.V. Dokuchaev's expeditions, did quite a lot to address issues related to timber lines and interrelationships between forest and tundra, and forest and steppe (Мелехов 1957).

It should be stressed that the Expedition was successful not only due to the talent and hard work of the team, but also because of the the Russian authorities. the Expedition's first report acknowledged this: "Concluding this Introduction, we cannot but express our deep gratitude to M.N. Ostrovskiy, former Minister of State Properties, State Secretary, A.S. Ermolov, Minister of

Agriculture and State Property, and E.S. Pisarev, Director of the Forest Department, for the highly enlightened initiative to answer such an important challenge for Russia" (Докучаев и Сибирцев 1894, p. 42).

Experimental Forest Management in the 19th – Early 20th Centuries

The Special Expedition opened a new page in forest science and forest and agricultural experimentation in Russia. Present-day Russian soil science, forest hydrology, biology of tree species, development of tree planting types and techniques in arid conditions originated from the operations to establish forest shelterbelts during V.V. Dokuchaev's Expedition. They are also the result of the Expedition's follow-up experiments within permanent sample plots in experimental forest management units (Двухсотлетие 1998).

According to Professor G.F. Morozov (1867-1920), forest experimentation involved all the institutions which were engaged in forestry research at the time. In view of long periods of tree growing, diversity of site conditions, and forest species composition, it was necessary to observe numerous and diverse sites continuously and over the course of many years. The availability of experiment stations was, and is, of particular importance for silviculture. Furthermore, experiment stations should operate as government institutions, creating enabling conditions for research and ensuring continuity of work, regardless of involved persons and their replacements. In most cases, forest experiment stations addressed silvicultural issues which could not be addressed by individual scientists (Морозов 1903b, p. 386).

According to G.F. Morozov, the scope of activities to be undertaken by such stations included meteorology, forest species distribution, impact of seed provenance on stand growth and development, growth and increment studies and development of tree growth and yield tables (volume tables), and analysis of wood properties and thinning effects.

In the Kamennaya Steppe, V.V. Dokuchaev's Expedition established a network of forest shelterbelts, In 1892–1893, the Kamennaya Steppe (Shipov Les/Shipov Forest) and Derkulskoye Experimental Forest Management Units were organized. Three sites of the Expedition were transformed into experimental forest management units in the Yekaterinoslav, Kharkov and Voronezh Oblasts. These units were institutions directly designated to undertake forest experimentation. At last, in 1900, a Forest Experiment Station was put in place under the Novo-Alexandria Institute of Agriculture and Forestry. Russian forest experimentation was on the eve of its significant expansion (Морозов 1903b, p. 387).

Indeed, the early 20th century saw the establishment of the following experimental forest management units (EFMU) in European Russia: Feodosiya EFMU (1901), Borovoye EFMU in the Samara Province (1903), Bryansk EFMU (1906), Shipov EFMU in the Voronezh Province (1908), Northern EFMU in the Arkhangelsk Province (1909), Kazan EFMU (1911) and other EFMUs. Each of these units were called to address specific scientific tasks of great importance for site-specific practical forestry (Лесное хозяйство СССР 1967). Later, they became forest experiment stations, or training and experimental forest districts (*Leskhoz)* of higher schools. It should be pointed out that many outstanding forest scientists headed such experimental or training forest management units (forest allotments) for a long time, and those facilities/sites could belong either to forest authorities or to vocational schools or to private individuals.

Steppe studies and reviews of steppe afforestation experience led to the development of proposals on how to combat droughts through establishing forest shelterbelts and other plantations of trees and shrubs. According to I.S. Melekhov, the steppe Great Anadol Forest Management Unit had a century-long history (it was established 1843). In the former steppe areas, these new forests came to be enriched with forest "companions" – forest grasses, shrubs and trees which had naturally

become established under the canopy of man-made forests. In Great Anadol, a big forest experiment station in the Mariupol area continued the work of steppe afforestation (Мелехов 1957, p. 128).

Drawing on findings from his work in the Great Anadol (Mariupol) Forest Management Unit, G.N. Vysotskiy (1865-1940) published an article under the heading: *Mycorrhiza in Oak and Pine Seedlings* (1902. In this article, he described the impact of mycorrhiza on steppe afforestation; he was the first among foresters to do so. The discovery of the symbiotic tree nutrition through soil fungi (1881) also belongs to a Russian botanist – F.M. Kamenskiy (Мелехов 1957, с. 123).

G.N. Vysotskiy's study and its findings, referred to above, were far ahead of the time and, for this reason, remained practically unnoticed. Only almost 50 years later, substantial studies began in Russia in this area. As a follow-up of G.N. Vysotskiy's efforts in the Great Anadol Forest Management Unit, N.P. Kobranov (1883-1942) undertook interesting studies in 1911-1915 to understand the nature of the black ice and its impact on the forest. He also established experiments to study the impact of forests on cropping capacity of fields.

S.A. Bogoslovskiy (1882-1944) became the first scientist in Russia who empirically established the dependence of oak wood properties on the forest type. He achieved this by experimenting in the Shipov Forest, and he presented the findings in his publication on the technical properties of oak wood (1915).

The Bryansk Forest Management Unit was the site where Professors P.Z. Vinogradov-Nikitin (1869-1938), A.V. Tyurin (1882-1979), V.P. Timofeev (1892-1981) and others started their research career. In the Northern Experimental Forest Management Unit, experiments and studies related to taiga (boreal) forests were led by such well-known foresters as S.V. Alexeev (1869-1930), A.A. Molchanov (1902-1985), I.M. Stratonovich and others. In the Kazan Experimental Forest Management Unit, the first forester was A.A. Yunitskiy (1878-1942).

The Borovoye Experimental Forest Management Unit has an interesting history. It is located in a unique pine forest, called *Buzuluk Bor* (Buzuluk Pine Forest). Its development started in the late 18th century. In the late 19th – early 20th centuries, it suffered from predatory overharvesting, repeated fires and droughts and was affected with other adverse factors. These led to large-scale drying of water sources and other stresses, with resultant transformations of the natural site conditions of the pine forest. Since 1843, it had provided a venue for experiments with various forest cutting practices, and since 1852, it had been an area of man-made forest cultivation (Годнев 1953).

The Borovoye Experimental Forest Management Unit was established with the help from G.F. Morozov, whose attention was drawn to the pine forest because it contained a highly robust plant community. Both in the Experimental Forest Management Unit and in the Buzuluk Pine Forest, numerous and long-term studies were undertaken by such well-known Russian foresters as G.N. Vysotskiy (1865-1940), G.F. Morozov (1867-1920), A.P. Tolskiy (1874-1942), M.E. Tkachenko (1878-1950), V.N. Sukachev (1880-1967), and V.G. Nesterov (1909-1977). The period of 1903-1917 was marked with fruitful activities. For instance, A.P. Tolskiy (1874-1942), a Forester in the Borovoye Experimental Forest Management Unit, collected scientific evidence and used it to describe forest regeneration in the Buzuluk Pine Forest. He established pilot plantations with a total area of about 500 ha for extensive experiments in arid south-eastern parts of the country.

In total, over 300 publications were dedicated to research in the Buzuluk Pine Forest. That is why the Buzuluk Pine Forest is referred to as one of the oldest hubs of Russian silviculture. In 1931, the Borovoye Experimental Forest Management Unit was reorganized into the Borovaya Forest Experiment Station. A year later, part of the Buzuluk Pine Forest area was set aside to establish the Buzuluk Nature Reserve (Годнев 1953). In 1948, conservation rules were developed which applied to the entire area of the Buzuluk Pine Forest. A self-standing administrative unit (the *Buzuluk Pine Forest* Management Department) was also instituted.

It should be pointed out that the Russian forest experimentation was initiated and pursued not only by the experimental forest management units, but also by the Special-Purpose Timber Cruising Team, which was put together in 1895 and led by V.D. Ogievskiy. Findings of its operations were published in the *Lesnoy Zhurnal*/Forest Journal (Морозов 1903b, p. 387).

In 1909, the first Russian seed control station for *forest* species was established in Saint Petersburg, thirty years after the first *general* seed control station had been established in Russia (in 1877). It is associated with A.F. Batalin, a botanist who founded the seed testing station under the Main Botanical Garden in St. Petersburg (Заборовский 1967). V.D. Ogievskiy (1861-1921) was the founder and first Director of the Forest Seed Control Station; he published key articles in this area (Огиевский 1910-1912).

It is also noteworthy that the first book about seed research (under the title: *Spermatology or Seed Science*) was published in 1882 by Nikolay E. Tsabel (1831-1910). N.E. Tsabel had collected data for the book, among other places, in the Crimea in 1866-1880; at the time, he was the Director of the Imperial Nikitsky Botanical Garden (Брокгауз и Ефрон 1903, с.785) in Yalta.

In 1883-1892, Professor M.K. Turskiy established the first provenance study plantations of pine and spruce within the Forest Allotment for Experimentation under the Peter Agricultural Academy. In 1893, his publication described harvesting of tree seeds and extraction of coniferous seeds from cones (Заборовский и Стратонович 1929).

In 1886, the *Rules for Seed Harvesting, Storage and Delivery* were published. In 1896, a publication about Russian tree seeds (Постников 1886) presented accumulated knowledge about forest seed breeding.

In the early 20th century, V.D. Ogievskiy made an enormous contribution to the establishment of both Forest Experiment Stations and Experimental Forest Management Units. He was one of the pioneers of forest experimentation in Russia: Earlier, he undertook a two-year study tour to learn about the organization of forest research work in Germany, France and Austria. He acquired indispensable experience in the process. In 1895-1896, he described his observations during the study tour in his publication about the forest experimentation in Austria, France, Prussia, Saxony. He later published a review of silvicultural research management (Огиевский 1895, 1896, 1900).

This publication proposed arrangements and a program of forest research and experimentation for Russia. Building upon his calculations, he suggested the needed number of stations and their locations in governmental and private forests. He opened several testing areas in the Sumy, Kiev, and Tula Provinces to conduct field studies, and each of them had a series of sample plots for experimentation. His 20 years of fruitful work resulted in the establishment of over 900 permanent sample areas (1895-1910) and experimental provenance study plantations. The latter were pine plantations, established through sowing in 21 locations in European Russia (1910–1916). His name is associated with forest seed breeding research, feasibility studies for oak and pine plantation establishment, and identification of mortality causes for plantations of various species. (Мелехов 1957; Бобров 1997; Курилыч 2001, Тарасенко и др. 2003; Giertych and Oleksyn 1981).

The work initiated by Professor V.D. Ogievskiy was followed up by Professor G.F. Morozov, who participated in forest experimentation congresses and, therefore, evaluated the work of Forest Experiment Stations on the basis of international criteria and practices. In particular, at the 10th Congress of Forest Owners and Managers (Riga, August 1903), he delivered a keynote address in which he identified the following three main directions for forest experimentation: (i) forest stand typology; (ii) studies on forest regeneration and forest fostering; (iii) research to understand interrelations of the forest with the climate, soil, and ground waters. (Морозов 1903a).

In a matter of years, he published over a dozen papers on this matter, including an extensive entry on *Forest Experiment Stations* for the Comprehensive Encyclopedia of Russian Agriculture

(Морозов 1901) and the Great Encyclopedia (Морозов 1903b). His article about forest experimentation was included in the Encyclopedia of Russian Forestry (Морозов 1903c). In addition, he wrote numerous articles about the development of forest experimentation, including plans of experimental operations and studies in the Kamennaya Steppe Forest Management Unit for the year 1901 (Морозов 1901), in the Buzuluk Experimental Forest Management Unit for the year 1903 (Морозов 1903d), various reports (Морозов 1903d, 1908) and position papers (Морозов 1904, 1908) on the organization and scope of experimental operations (Морозов 1903e, 1918), and on the institution of new experimental forest management units (Морозов 1906a).

In particular, Professor G.F. Morozov wrote an extensive article where he strongly advocated the need to establish an experimental forest management unit in the Bryansk forests. This unit would be the first facility of this kind in this forest zone. According to that article, the Bryansk forest was quite specific and had its own physical and geographical characteristics, as well as a very vast area. These factors alone justified a separate experimental forest management unit for the Braynsk forests. In his opinion, experimental forest management units should be always selected in representative regions to serve them. Furthermore, Professor G.F. Morozov wrote that the Bryansk forests were undoubtedly a separate silvicultural area, but it was nevertheless necessary to establish a separate institution for experimental forest management. Morozov observed that this must be done immediately, rather than waiting for the time when it would be possible to cover all European Russia with the network of experimental forest management units. Such a case for the establishment of an experimental forest management unit in the Bryansk forests could be confirmed with a broad range of silvicultural and forest management considerations (Морозов 1906a, p. 283-284), and his keynote paper examined those considerations.

Such a forest management unit was also needed because there were compelling reasons for the central administration's longstanding desire to shift the focus of forest experimentation from the forest-steppe zone to forest zone. The administration was concerned about this not only for such important (but narrow) reasons as the availability of old cutovers and unsuitability for stand establishment, but also because of a much broader and, hence more important motivation. The opening of the first experimental forest management unit in the forest zone would mark turning point in forestry. It would ensure a shift from inaction with respect to cutovers, towards their care and proper treatment. The goal of such an experimental forest management unit should be to search for forest felling practices that would be conductive to natural seed-based regeneration. Morozov called this the most important goal, above all other goals in silviculture. With this approach, he wanted to ensure that the future (Braynsk) experimental forest management unit would cater not only for its local vast area like any other experimental forest management unit, but would also be of broader importance for the future of forest experimentation in Russia – and for silviculture as a whole.

While striving to meeting their own needs and needs of their districts, both steppe and forest-steppe experimental forest management units also always had a broader mission: to demonstrate how to organize good forest research. Following that tradition, the experimental forest management unit which would be put in place in the Bryansk forests was called to generate best practices and guidelines on how to address the selection of cutting techniques to be tested in this type, and how to arrange respective studies (*ibid.*, p. 287).

The area for the new experimental forest management unit was identified by a Board, chaired by M.M. Orlov, Professor of the Imperial Forest Institute. The Board consisted of Professor G.F. Morozov, G.N. Vysotskiy, Member of the Standing Committee on Forest Problems under the Forest Department, Inspector for Forest Inventory and Planning, as well as Professor

P.A. Zemyatchenskiy[7], who conducted soil and geological research there, local forest rangers Dombrovskiy and Koshkarev, and P.Z. Vinogradov-Nikitin, first Director of the instituted Forest Management Unit (Труды по лесному опытному делу 1906, p. 2). The unit consisted of 30 compartments within the Svensk Forest Allotment.

The Board proposed that such experimentation areas be used for studies related to: various techniques for final and intermediate cutting for purposes of silvicultural treatment; assessment of forest stand growth to justify normal rotations; and forest management surveys in the Bryansk forests within seven forest management units with a total area of 80,000 hectares. M.M. Orlov visited the Bryansk Experimental Forest Management Unit thrice. He chose the locations for the unit's office, weather station, house for the Forester, and premises for V.D. Ogievskiy's Timber Cruising Team (Шошин и Решетников 2006, p. 116).

The Board recommended that efforts be focused on studies to define techniques for final and intermediate cutting and assessments of forest stand growth. Professor A.V. Tyurin, a well-known forest scientist, was the fourth Forester of the Bryansk Experimental Forest Management Unit. In 1911-1919, he established provenance study plantations of the pine there and conducted numerous other studies, the results of which were published in 1925 in a voluminous book about the basics of the silvicultural system for pine forests. The book was reprinted 25 years later (Тюрин 1952).

In 1915, there were 12 experimental forest management units in government-owned forests in Russia, and those units were quite adequately funded from the budget. For example, in 1906-1915, the Forest Department increased their spending on the experimental forest management units from RUR 24,500 to RUR 85,000 per year. In spite of the fact that the spending increased 3.5 times, publications of the time noted the gap between the status and progress of forest research development; they also noted the needs of practical forestry in Russia (Двухсотлетие 1998).

The changes in forest experimentation over time may be traced through two publications of Professor M.M. Orlov: his keynote paper called *Needs of Russian Forestry* (1906) and a detailed review called *Essays on How to Arrange Forest Experimentation in Russia* (1915). The latter was based on respective studies in Russia and several other countries. M.M. Orlov understood the specifics of forest science and advocated the need for long-term planning of forest use and forest management. Orlov also advocated for continuity in the organization of long-term studies and operations within experimental areas. He submitted proposals for further comprehensive forest studies, and the development of forestry research as a separate system, consisting of respectively targeted units (Орлов 1906; 1915).

M.M. Orlov's proposals engaged both supporters and opponents of forest research reform. Previously, many foresters deemed higher forest schools to be the main (and even the only) organizations which undertook forest research. Curiously, one of the opponents of Russian forest experimentation development was A.N. Sobolev (1871-1911), one of the brightest forest scientists of the time. In his opinion, forest experimentation objectives were divided into two parts: (i) to improve practical forestry, and (ii) to advance silviculture as a science. The first priority was, certainly, given to improved practical forestry rather than progress in science because the forest research required for Russian forestry at the time already existed in Western countries. Russian foresters could benefit from this research; but improved forest management was essential for the rapidly developing Empire (Соболев 1908). Nevertheless, A.N. Sobolev made a big contribution into the development of Russian forest science and practice during his short life. In particular, he established many provenance study plantations of pine, oak and larch, based on the IUFRO patterns (Мерзленко и Бабич 2005).

[7] P.A. Zemyatchenskiy (1856-1942), Russian and Soviet mineralogist and soil scientist.

The diversity of Russian forests and site conditions for forest management provided M.M. Orlov with solid grounds for organizing forest research as follows: through forest experiment stations and experimental forest management units which would be administered and guided from a single centre, such as from the Central Forest Experiment Station. Units would be both subordinated to, but nevertheless an integral part of, the Forest Department. As a high-standing university professor and a government official, M.M. Orlov understood that forest higher schools, forest management entities and other stakeholders could get involved in forest experimentation (Шутов 2007). Prior to 1917, experimentation operations in government-owned forests were managed by the Special-Purpose Standing Committee for Forest Experimentation under the Forest Department. It was established in 1906 to reorganize forest experimentation (Высоцкий 1960). In 1907-1917, the Committee was chaired by M.M. Orlov and consisted of Professors G.F. Morozov, G.N. Vysotskiy, V.D. Orievskiy, K.K. Gedroits, and D.I. Tovstoles (Великанов и др. 2009).

Professor M.M. Orlov identified three stages in the development of forest experimentation in Russia and characterized each of them as follows:

During the first phase or assumption period (1843-1891), the foundation for forest experimentation was constructed by M.K. Turskiy, A.F. Rudzskiy, E.I. Shenrok and others. The first forest experiment facilities established in Russia, i.e., the Great Anadol and Berdyansk Forest Management Units in 1843 and 1846, respectively; and the Petrovsko-Razumovskoye Forest Allotment in 1865.

That period also included such events as the First National Congress of Forest Owners and Forest Managers, which took place in Moscow in 1872 and highlighted forest experimentation to some extent in the presentation prepared by Professor M.K. Turskiy, who identified the following key objectives for forest experimentation in a holistic manner: (i) develop forest experimentation programs and methods; (ii) establish sample areas; (iii) collect data to compile volume tables; and (iv) define indicators for tree measurements.

The second phase or initiation period (1892-1905) was associated with the Special Expedition of the Forest Department in 1892-1899. It was led by V.V. Dokuchaev and was meant to identify causes of the droughts and develop response interventions for the temperate zone (agricultural belt) in European Russia. The Ministry of Agriculture and State Property arranged an expedition which operated in the period of 1894-1902 under the leadership of Alexey A. Tillo (1839-1899/1900). The expedition studied forest landscapes in the main stream network in the agricultural belt of European Russia, and designed measures to regulate the water regime of this territory and prevent losses of rivers. The Forest Department also instituted a Special-Purpose Timber Cruising Team, led by V.D. Ogievskiy, to conduct studies in the natural regeneration of forests, silvicultural treatments in young stands, forest stand growth and increment, and elaboration of techniques to measure the volumes of standing trees within permanent sample plots.

During the 9th National Congress of Forest Owners and Forest Managers (Samara, 1898), M.M. Orlov also reported about the development of forest experimentation. He articulated the key proposals as the following four objectives: (i) Forest Experiment Stations should be instituted under higher schools; ii) all who are willing and able should be engaged in experimental operations; iii) it is advisable to convene annual congresses dedicated to forest experimentation; and iv) forest experimentation programs and plans should be reviewed and approved by the Special Forest Committee. The publishing of the proceedings of A.A. Tillo's expedition (1895-1905) started.

The third phase or contemporary period (1905-1915) started with setting up a Special-Purpose Standing Committee for Forest Experimentation in 1906. It was chaired by M.M. Orlov. Seven new experimental forest management units were organized (Bryansk, Shipov Forest, Northern, Kazan, Trans-Oka, Faschevka and Tripolye). In addition to the existing Kamennaya

Steppe, Derkulskoye and Great Anadol EFMUs, Okhta and Ruda Forest Allotments for Experiments were established in 1907. The publishing of the proceedings on forest experimentation began[8].

The first field experimental station, the cradle of national agricultural science, was founded in 1867 by Professor Ivan A. Stebut (1833-1923) under the Peter Academy of Agriculture and Forestry, and occupied a former experimental field. In 1876, when Professor F.K. Arnold was the Director of the Academy, a program of testing agricultural machines and tools was developed to be implemented by the Experiment Station. But, similarly to forest science, Russian agricultural sciences had had practically no support from the government until the late 20th century. They were funded primarily by civil society organizations.

The first government-owned agricultural experiment stations were established in the 1890s during the Special-Purpose Expedition, which was led by V.V. Dokuchaev. By that time, the Ministry of State Properties had already requested drafting regulations not only on forest experiment stations, but also on agricultural and entomological stations. Public discussions of experimentation activities were taking place, and they were being proactively supported by society, local self-governance bodies, philanthropic landlords and industrialists. The Ministry's request was therefore quite timely, though its steps were re-active rather than pro-active.

In different periods, the program for agricultural experiment stations, fields, nurseries, and farms was developed by prominent scientists and practitioners, including I.A. Stebut, (1833-1923), P.A. Kostychev (1845-1895), V.V. Dokuchaev (1846-1903), A.S. Ermolov (1847-1917), V.R. Williams (1863-1929), D.N. Pryanishnikov (1865-1948), V.V. Talanov (1871-1936), A.G. Doyarenko (1874-1958) and others.

In agriculture, experimentation and its institutionalization efforts were less successful than forest experimentation – specifically, the establishment of forest experiment stations and experimental forest management units. Nevertheless, in 1908, the relatively final program was disclosed at the National Workshop on experimentation, held in Kharkov. The outputs of the workshop provided a basis for drafting the *Law on Establishing Agricultural Experiment Institutions*, which was submitted to the Duma. Upon refinement, it was approved/signed in 1912 (Елина 2008).

In the same period (in 1909), the Special-Purpose Timber Cruising Team was reorganized to become a tree seed testing and control station, headed by V.D. Ogievskiy. Other newly instituted entities were (i) the entomological laboratory, headed by I.Ya. Shevyryov and designated to work out insect pest control measures; and (ii) the laboratory to undertake operations (studies) in the field of pedology and physiology of arboreal plants. It is noteworthy that the *objectives of forest experimentation in the North* were on top in the agenda of the 12th Congress of Forest Owners and Forest Managers (Arkhangelsk, 1912): it was the third of 28 agenda items (Леса Севера 1912).

In pre-revolutionary Russia, Forest Allotments—specifically, the Lisino Forest Management Unit and the Okhta Forest Allotment under the St. Petersburg Imperial Forest Institute—were meant primarily for hands-on summer training of students from forest schools. Meanwhile, the Experimental Forest Management Units were subordinate directly to the government forest agency. It was only after the revolution that the term '*training and experiment enterprise'* emerged to denote Forest Allotments and Forest Management Units, and later forest districts (*leskhozes*). One of the first post-revolutionary publications, describing training and experimental enterprises, was a collection of articles under the editorship of Professors L.A. Ivanov, N.P. Kobranov and V.N. Sukachev (Природа и хозяйство… 1928).

By the year 1914, the development of forest and agricultural experimentation resulted in the

[8] The Proceedings of the Special Expedition (1894-1898) were renamed into the *Proceedings on Forest Experimentation* (1890-1906) and their updated version was published in 1907.

operation of 287 various experimental institutions in Russia, including experiment stations, field and forest management units, water-logged experimental fields, cotton breeding stations, forest, animal and diary stations, nurseries, and 35 supervisory agricultural institutions of various types, primarily for seed and fertilizer control (Список… 1915).

Why were foresters' initiatives more successful? Some authors suppose that it could be attributed to the fact that Russian foresters professionalizated to a greater degree than agronomists or applied entomologists (Федотова 2013, p. 433).

This is quite understandable: over several centuries, foresters regarded the forest as an integral system, providing humans with all vital resources, as the forest is a more complex system than the agricultural field. The development of forest science and educationre flected this understanding of the forest and the need for an integrated and long-term approach to forest research, particularly given the long periods of forest growing which make the cost of errors very high and lead to long-term mismanagement (Teplyakov et al. 1998).

The Russian world sees the forest as an entity on a planetary scale. Vladimir I. Vernadskiy (1863-1945), great Russian scientist and thinker, authored a doctrine about the Biosphere and its transformation into the Noosphere under the influence of Collective Mind and Human Labour. The scientist noted that the Noosphere would have to meet physical and spiritual needs of the growing population of the Earth, and the forest would play a critical role as a mighty stabilizer of the Biosphere. According to V. Vernadskiy, dense tropical and subtropical forests, temperate forests, and boreal taiga, savannas, tundra, are all manifestations of self-perpetuating or periodically resuming continuous green cover of the planet. Man causes disturbances, but these activities only redistribute rather than reduce the green land transformation of the energy (Вернадский 1989, p.46).

V.I. Vernadskiy conveys the differences between the hydrosphere and terrestrial sphere, and their relationship to the status and dynamics of the thin 'film' of Life (the Biosphere). He notes that activities of the 'civilized' human being have caused modifications in the structure of this 'film' which are not found anywhere in the hydrosphere. These modifications are a new phenomenon in the geological history of the Earth, and its geochemical effect has not yet been ascertained. One of its main manifestations is the extraordinary reduction of the forested spaces – for instance, shrinking of the stronger parts of the film (*ibid.*, p. 109). V. I. Vernadskiy's hypotheses were later substantiated by researchers.

As a result of the forest cover reduction which has been caused by the development of humankind, artificial mechanisms have been elaborated to regulate and stabilize the interrelations between Man and Nature. These mechanisms are based on balanced natural resource management practices which evolved into the principles of non-depleting and continuous, and, then, sustainable forest management. V.I. Vernadskiy offered a holistic understanding Nature and Mankind's place in it (Вернадский 1978, 1989, 1997). His perspectives were confirmed by, and reflected in, political decisions at the highest level (КОСР 1992).

Against all the odds, Russian forest science has been keeping pace with the times in both theoretical and practical dimensions of forest experimentation. The first experimental forest management units (regardless of how they were named or renamed over time) emerged together with higher forestry schools in St. Petersburg (1803) and Moscow (1865). The Lisino Forest Allotment, Training and Experimentation Forest Management Unit under St. Petersburg Forest Institute (since 1834), and the Forest Allotment for Experimentation (1862) under the Peter Agricultural and Forest Academy were the first experimental forest management units in Russia. The Great Anadol Forest Management Unit (1843) and Berdyansk Forest Management Unit (1846)

were reorganized into the Berdyansk Training Steppe Forest Management Unit in 1859[9]. Since their establishment, they have operated as experimental facilities.

Forest Periodicals in Russia before the 1920s

Even by today's performance standards for research work, the old Russian forest management units were highly professional research institutions. The results of their activities were not only referred to in reports, but also published in periodicals and books. The *Selskoye Khozyaistvo i Lesovodstvo*/Agriculture and Silviculture Journal, which existed from 1865[10] until 1918, published many valuable and original forestry articles.

In the late 19th century and early 20st century, other journals were published, including: *Lesopromyshlennyi Vestnik*/Timber Industry News (in Moscow since 1899 till 1917 under the editorship of P.S. Nesterov); *Russkoye Lesnoye Delo*/Russian Forestry (published in 1892-1894 in St. Petersburg by Professor V.Ya. Dobrovlyanskiy); Otchety Moskovskogo Lesnogo Obschestva/Reports of the Moscow Forest Society (1894-1897) (Мелехов 1957, p.72).

In St. Petersburg, regular forest publications included: the Yearbook of the St. Petersburg Forest Institute (1886-1891), the Newsletters of the St. Petersburg Forest Institute (1898-1917), *Lesopromyshlennik/*Timberman (1910-1918), and *Les/*Forest (1913-1915). In 1899, the first issue of the *Pochvovedeniye/*Soil Science Journal was published and included an article by G.F. Morozov under the heading: *Soil Science and Silviculture*. The *Lesnoy Zhurnal/*Forest Journal was first published in 1831, and in the end of 1904, G.F. Morozov was elected to be its Editor. Since 1905, ten instead of six issues of the Journal were published every year because of large amount of submitted articles and information (Бейлин 1962).

Selected matters of forest science and silviculture were also highlighted in the *Priroda/*Nature Journal (1912) and *Botanicheskiy Zhurnal*/Botanical Journal (1916) which were launched at that time and still exist. After 1917, opportunities to publish research papers broadened with the creation of new forest journals. These included *Lesnaya Nov'*/Forest Novelty (1918), *Lesnaya Promyshlennost/*Timber Industry (1921), *Lesnohye Khozyaistvo*/Forestry (1928), *Lesnoi Zhurnal: Izvestia vuzov/* Forest Journal: News from Higher Schools (1958), and *Lesovedenie/*Forest Science (1967). Selected issues of forest science and silviculture are also highlighted in the following journals: *Vestnik Selskokhzyaistvennoi Nauki/*News of Agricultural Science (1956), and *Zaschita Rasteniy/*Plant Protection (1966). (Тепляков, Бергер 1994).

The initiative of the Forest Department of the Ministry of Agriculture and State Property published a series of studies called *Proceedings of Experimental Forest Management Units of the Forest Department.* These began in 1900 in St. Petersburg and proceeded as research outputs were accumulated. For a long period of time, the Proceedings were edited by N.D. Adamov (1861-1912), who was Professor of the St. Petersburg University and a prominent plant breeding expert, soil scientist and meteorologist. One of the first issues was dedicated to the distribution of general meteorological elements, humidity and temperature in the soil, ground waters and snow cover in experimental forest management units (Адамов 1900; Труды опытных лесничеств 1901).

Apart from data of meteorological observations in the Experimental Forest Management Units, abstracts of the Proceedings were prepared for the Forest Department over the course of

[9] In 1867, the Forest Management Unit was awarded with a bronze medal at the World Exhibition in Paris (Старобердянское лесничество. 2014. Исторические памятники http://www.mgk.zp.ua/material/194.html

[10] It was a follow-up of the *Zhurnal Ministerstva Gosudarstvennykh Imuschestv*/Journal of the Ministry of State Properties which was published since 1841. Since the Journal was renamed, its Editor was F.A. Batalin (1823-1895) for a long time, and his successor was A.F. Rudzskiy (1838-1901) who held that position in 1895-1901.

several years. Proceedings were also published in forms such as *Report of Experimental Forest Management Units for the Year 1912,* which contained information from the Northern, Borovoye and other Experimental Forest Management Units. Later, the *Proceedings of Experimental Forest Management Units* were replaced by *Proceedings of Forest Experimentation in Russia* which were issued during the period of 1907–1916, and later. The Proceedings contained articles of many outstanding scientists of that time. For instance, the 1915 issue included Professor M.M. Orlov's paper, titled "Essays on how to arrange forest experimentation in Russia" (Орлов 1915).

The decade of 1907-1917 produced 60 issues of the Forest Experimentation Proceedings (Орлов 1930). Many well-known scientists of that time provided their editorial inputs for the Proceedings. For example, the Editor of Issue XV (1909) was G.N. Vysotskiy; Issues XXII (1909), XXIX (1911), ILVIII, LI (1913) and LVI (1915) were edited by A.A. Kaminskiy; and G.F. Morozov was the Editor of Issues XXXI (1911) and LIV (1914). The last 'pre-revolutionary' issues were published in 1916 (Печникова, Стельмахович 1928).

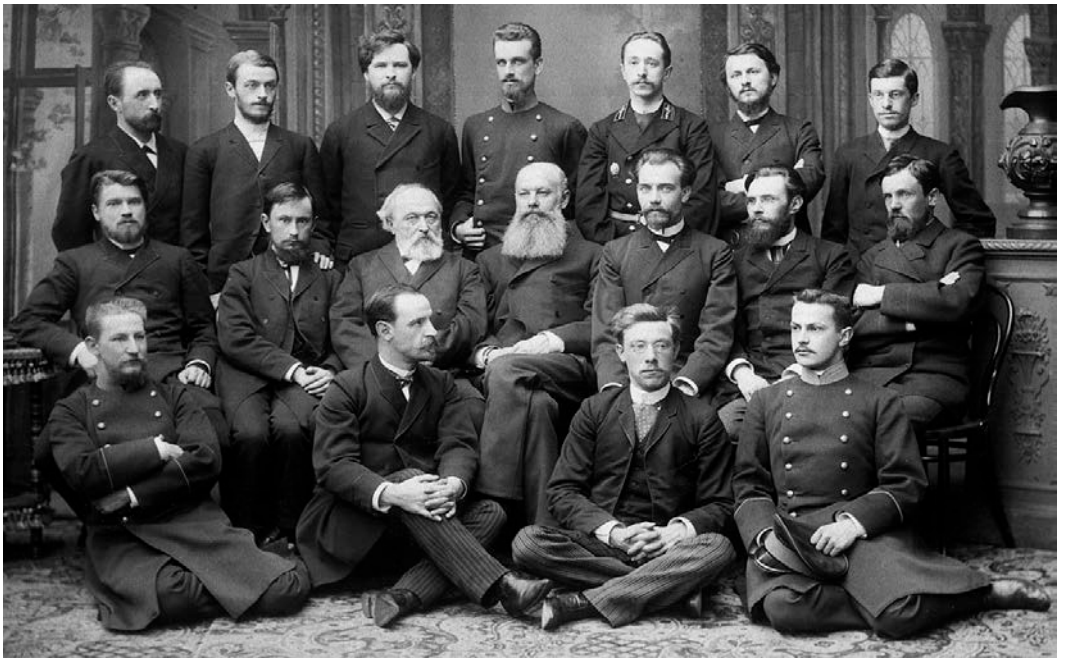
Professor I.S. Melekhov played an important role in publishing the Proceedings of Professor V.V. Dokuchaev's Expedition (1894-1895, 1898 – a total of 18 volumes). He was also instrumental in the publication of *Proceedings of Experimental Forest Management Units* (1900-1906) and Proceedings of Forest Experimentation in Russia (1907 – 1926), which aided in the development of Russian forest science. Proceedings of educational institutions started to acquire practical importance. *The Notes of the Novo-Alexandria Institute of Agriculture and Forestry* (since 1876) and *News from the Peter Academy of Agriculture and Forestry* were particularly esteemed (Мелехов 1957, p. 72).

The growing number of publications necessitated the preparation of bibliographical guides for the Proceedings. The Report for the year 1906 (Труды по... 1907) listed the papers on forest experimentation which were published in the Proceedings of the Expedition, sent by the Forest Department and led by V.V. Dokuchaev; it also listed the papers which were published in the *Proceedings of Experimental Forest Management Units* in the period of 1894-1906. Later, a *Systematic Index of the Proceedings of Forest Experimentation in Russia,* covering the period of 1894-1926 was produced to guide readers (Печникова и Стельмахович 1928).

The growing number of publications and other outputs of forest science and practice led to the preparation of bibliographical datasheets (Морозов и Поле 1915).

* * *

Exploring new areas, identifying new challenges and breaking new grounds, Russian forest science has succeeded in securing intergenerational continuity for a long time. Notional and contextual links have been preserved among scientists, practitioners and educators working in higher and secondary vocational forest schools, academies of sciences, government research institutions, experimental and training forest management units and private forests. The experience gained in the past is continually followed up and further developed, contributing into the pool of achievements and successes of Russian forest science.



[Professors A.V. Sovetov and V.V. Dokuchaev (right) and their team, 1900s.
P.V. Ototzky stands behind V.V. Dokuchaev. Source: Зятьков и Соловйов 2012.]

[The founders of IUFRO – Gründungsväter, 1892. Source: IUFRO Secretariat.]

Chapter 2
Preparatory Phase

The idea to join forest research efforts at the international level had been in the air for years, perhaps for decades. Too many facts and disasters which threatened forests arose over Europe. A strong impetus arose from the need to solve such problems, as well as to elaborate internationally consistent approaches to forest research. This would involve agreeing upon the same denominations of values and measurement methods in order to ensure data compatibility, define new research agendas and methodologies, and develop a shared forest terminology. The solution seemed to be the establishment of a common base: IUFRO.

It was clear that regular meetings of representatives from different countries could be conducive to further development of theoretical and applied knowledge about the forest and its use. The extent of forest research called for unifying efforts in selected areas of scientific knowledge; therefore, thematic groups of stakeholder scientists and specialists appeared to be the most appropriate format for cooperation. International meetings enabled researchers to communicate information about the status and results of their work for a period of time, discuss and review successes and failures, establish new contacts and further develop the existing collaboration among researchers, scientists, scholarly traditions and countries.

German-speaking countries (first of all, Germany, and also Austria and Switzerland) had been trend-setters in the European forest sector for a long time and for this reason it was their initiative that led to the establishment of the new international organization for sharing experience, conducting joined studies and ensuring advancement in forest sciences.

According to Professor M.M. Orlov of Saint Petersburg Imperial Forest Institute, "the importance of empirical silvicultural research was recognized from the very start of using scientific findings to address forest management issues; but the idea to establish forest experimentation organizations arose much later, and in 1861, Professor [E.] Ebermayer[11] was practically the first to indicate that to ensure effective development of silviculture, it was necessary to put in place forest experimentation institutions with the responsibility for their organization to be assumed by government. From the first steps towards the implementation of this idea, there was a controversy among advocates of forest experimentation with respect to institutional and operating arrangements for such facilities. Some people, including Ebermayer and [C.J.] Heyer[12], understood that such significant states as Prussia and Bavaria should institute forest experiment stations as self-standing facilities under their central forest agency whereas others, e.g., J.F. Judeich[13] and B. Danckelmann[14] argued that forest experiment stations should be established under higher schools of forestry. The latter opinion prevailed and almost all German forest experiment stations were instituted under higher schools" (Орлов 1915, p. 151).

[11] Ernst Wilhelm Ferdinand Ebermayer (1829-1908) was a Professor at Forest Academy in Abteilung, Bavaria.
[12] Carl Justus Heyer (1797-1856) was forestry practitioner, scientist and teacher at the University of Giessen, Hesse
[13] In 1866-1894, Johann Friedrich Judeich (1828-1894) was a Director of the Academy of Forestry in Tharand, Saxony.
[14] Bernhard Engelbert Joseph Danckelmann (1831-1901) since 1866 was a Director of the Forest Academy in Eberswalde, Prussia. Later, he became the second President of IUFRO.

Professor Johann Christian Hundeshagen (1783-1834)[15], a key figure in silviculture, was most likely the first to articulate the need for silvicultural experiments. In the mid-1820s, he considered unification-related challenges of compiling normal forest yield tables for timber cruising based on new scientific principles (Hundeshagen und Miller 1826). Later, in 1848, Professor Carl Justus Heyer proposed to systematize such approaches (Fernow 1911, p. 147).

According to available data, "the movement for experiment stations took shape, the first set being instituted in Saxony, in 1862, by establishing nine stations for the purpose of securing forest meteorological data, the next in Prussia in 1865 to solve the problems of the removal of litter, and in Bavaria (1866), also for the study of forest meteorology (E. Ebermayer), and the problem of thinning" (Fernow 1911, p. 147). Some authors argue that it started in 1861, when experiment stations were established in six forest management units on an area of 23.5 ha in Saxony, and then, in other places where observations and experiments were conducted irrespectively of the common idea (Бейлин 1962, p. 91).

Professor Franz von Baur (1830-1897)[16] is considered to be the pioneer in this field: he gave a tangible impetus to the development of common international approaches to forest research at the International Congress on Agriculture and Forestry in 1868 in Vienna. The Congress assembled a task force of German foresters and soil scientists who were keen to work out a plan of research work activities (Heske 1938). Also in 1868, a proposal to establish a forest experiment station in Austria was put forward, but it was implemented only in 1875. In 1870, the first forest experiment station was instituted in Baden, and then in other Lands of Germany. In 1872, at their first Congress, they decided to establish an association of such stations in Germany. With that, a new era began in the development of forestry science in Germany (Fernow 1911)[17].

Forest Experiment Stations in Russia

In Russia, Professor V.T. Sobichevskiy (1838-1913) of the Peter Academy of Agriculture and Forestry[18] was the initiator and an ardent advocate of the establishment of forest experiment stations. He was certain that the success of forest research depended to a great extent on long-term observations within permanent sample plots at forest experiment stations, instituted for this purpose. To ensure compatibility of results, it was necessary to secure uniformity of research methods and plans to arrange studies. Professor Sobichevskiy also attached much importance to intergenerational continuity not only in forestry, but also in forest experimentation.

Professor V.T. Sobichevskiy deemed it necessary to put in place and equip central (main) and local (secondary) forest experiment stations. The central stations would be instituted under higher schools of forestry, such as the Peter Academy of Agriculture and Forestry, and local ones

[15] Johann Christian Hundeshagen (1783-1834) was a German forester, forest scientist and a Professor at the University of Giessen, Hesse. He belongs to six German forest encyclopaedists ("forstlichen Klassiker") alongside with above mentioned C.J. Heyer, and Georg Ludwig Hartig (1764-1837), Johann Heinrich Cotta (1763-1837), Friedrich Wilhelm Leopold Pfeil (1783-1859), and Gottlob König (1779-1849).

[16] Franz Adolph Gregor von Baur (1830-1897) was a German forester and forest scientist, and since 1878 – a Professor of silviculture at the University of Munich, Bavaria.

[17] The Association was founded practically immediately upon formation of the German Empire as a single state (in 1871). Nevertheless, each station represented, as earlier, interests of the kingdom or principality where it was located.

[18] Established in 1865 in Moscow; in 1889, the Academy was reorganized into Peter Academy of Agriculture; in 1894 it was renamed in the Moscow Institute of Agriculture; in 1923 – the Academy of Agriculture named after K.A. Timiryazev; in 1994 – the Moscow Academy of Agriculture named after K.A. Timiryazev; since 2005 – the Russian State Agrarian University named after K.A. Timiryazev (reffered also as Moscow Timiryazev Agricultural Academy).

would be located in accordance with the focus of experiments. To give an example, he designated the Kazan Province as a location for a forest experiment station to study oak, the Tula Province to study the linden, ash, maple and aspen, and the Urals region to study larch. He deemed it advisable to undertake physical, chemical, physiological, biological, forest enumeration, economic, statistical and other investigations at such stations. Professor V.T. Sobichevskiy argued that experiment stations were required for silvaculture; without them, it would be difficult make any reliable conclusions due to scarcity and low credibility of silvicultural data (Собичевский 1869, 1876).

Russian foresters followed a course in forest experimentation which paralelled that of Germany. However, the two countries differed significantly in their approaches to research arrangements and methods. For instance, N.M. Zobov (1822-1873), Professor of the Saint Petersburg Agricultural Institute[19] thought that Russian silviculture could not draw upon German experiments because the differences in the climate and terrain led to substantial differences in forest tree growth regularities. This is to say nothing about differences in economic affairs between the two countries. Professor Zobov also asserted that a great nation ought to develop its science on its own, rather than eat crumbs from the table of its neighbours (Зобов 1871, p. 19).

Professor G.F. Morozov of the Saint Petersburg Forest Institute viewed this differently. He observed that at the earliest stage of forest experimentation in Germany, "a radical and fatal mistake was made: silvicultural phenomena to be investigated were artificially torn apart into two groups – one related to forest statistics and the other one related to natural history, with the latter one delegated to naturalists. By that way, foresters consciously refused to investigate causes of silvicultural phenomena and focused only on identification of such phenomena or results of management interventions". So, "forest experimentation may not be aimed at finding facts, well-known to practitioners; it should necessarily provide their scientific explanation. The forest investigator would not be able to perform his duty or achieve recognition of practitioners unless he is keen to go into natural sciences per se instead of confining to statement of facts" (Морозов 1901, p. 320-321).

Views on how to arrange forest experimentation varied. Professor V.T. Sobichevskiy believed that experiments should rest with "specially designated staff". Professor N.M. Zobov, on the other hand, argued that this function should be assigned to officials from the national forest agency to complement their direct duties. Prominent forester Pavel K. Knorre (1842-1908)[20] noted in 1874 that "many model forest management units conducted experiments which confirmed the success of various forest cultivation operations, but failed to demonstrate their financial benefits and were of little interest as scientific facts" (Бейлин 1962, p. 120). Such divergences largely affected the subsequent development of forest experimentation as a whole (Орлов 1915).

There were attempts to launch "brainstorms" to discuss various dimensions of progress in forest science and forest experimentation. In Russia, these problems were in the focus of the Forest Society. The Charter of the Forest Society had been approved by the Russian Minister of State Properties on March 2, 1871. As soon as in 1872, at the request of the Forest Society, the 1st Russian National Congress of Forest Owners and Forest Mangers was convened. Its agenda consisted of five items, the third of which was worded as follows: Needs Assessment for Experiments and Observations, and Ways and Grounds to Conduct Them.

This wording was echoed in the conclusion under the first item of the agenda – that field

[19] Established in 1803, Saint Petersburg Forest Institute changed its status and name a few times: in 1837-1864 – Institute of Forestry and Land Survey; 1863-1865 – Forest Academy; 1865-1877 – Saint Petersburg Institute of Agriculture with agricultural and forest departments; 1878-1903 – Saint Petersburg Forest Inistitute, 1903-1914 – Saint Petersburg Imperial Forest Institute, 1914-1929 – Petrograd/Leningrad Forest Institute, 1930 – Leningrad Forest Technical Academy (in 1935, it was named after S.V.Kirov); since 2003 – Saint Petersburg State Forest Technical University named after S.V.Kirov.

[20] The Manager of Count A.S. Uvarov's Chernyshevskaya Forest Allotment in the Penza Province.

trials in different parts of Russia had helped to identify the most successful and cost-effective forest renewal practices and showed how to make tree seed harvesting cheaper. Overall, that due to lack of experiment data from different parts of Russia, it was impossible to conclusively identify the most preferable technique for a given location (Бейлин 1962).

The reports, presented by N.M. Zobov, M.K. Turskiy and F.M. Polonskiy, articulated three guidelines with respect to forest experiment stations.

Professor N.M. Zobov presented his earlier published findings, in which he stated that there was no need to establish experiment stations, because each forest management unit should operate as an experiment station. M.K. Turskiy, by contrast, suggested that forest experiment stations should be initially instituted under forest schools, and their uniform programs should be designed by their faculty. For purposes of instituting new stations, he advised implementing awareness activities and collecting data on a continuous basis for the preparation of local volumetric tables. In addition, he suggested that the Congress should choose a measurement unit for trees. F.M. Polonskiy identified the first priority issues. Ultimately, the Congress recognized the importance of systematic long-term studies and adopted its resolution to institute silvicultural stations. The Congress also acknowledged the need to instruct the Forest Society to design a research program and mobilize funds for the institution of such stations in government and private forests (Орлов 1915). Two out of the tree speakers represented forest schools: N.M. Zobov was a Professor from the St. Petersburg Institute of Agriculture, and M.K. Turskiy taught in the Lisino Forest School (Yager School) at that time[21].

The discussion continued at the Forest Society's meetings in 1873-1874, and added new nuances to the process. For instance, A.F. Rudzkiy (1838-1901), a well-known Russian forester (and later, a Professor of Saint Petersburg Forest Institute) wrote in his 1873 letter to the Forest Society that forest experiment stations were not needed as much as selected operations to address the most essential matters of the current practical forestry. These operations, Rudzkiy proposed, were to be undertaken by local forest rangers.

E.I. Shenrok, Senior Forest Cruiser[22], had a different perspective: He argued that a change in the scope of forest rangers' job duties would not make sense. Moreover, he believed that it would be reasonable to establish exemplary (i.e., model) forest management units, rather than experiment stations.[23] He thus stressed the importance of systematic action in accordance with respective management plans.

In the course of the discussion, M.K Turskiy tried to integrate those different approaches by classifying experiments into two groups based on their setting – either in forest management units or at experiment stations. As a result of the discussion, the Forest Society was determined not to put such stations in place. However, the same Forest Society spoke of the need to open experimental forest management units and institute a central entity which would pool together forest experimentation activities. These activities were to be implemented both by experimental forest management units and by voluntary forest rangers. Such pooling would be based on a published program of experimental activities (Орлов 1915, p. 206). The Forest Society actively discussed that matter for a long time, but had no financial resources to establish experiment stations. Therefore, the Board of the Society refused to adopt any resolution on the matter (Федотова 2013, p. 432).

A different trajectory for the institutionalization of forest experimentation emerged after the

[21] From 1876 untill 1899, he was a Professor of Peter Academy of Agriculture and Forestry (since 1889 – Peter Institute of Agriculture) in Moscow, K.A. Timiryazev Russian State Agrarian University.
[22] Later, he became a Deputy Director of the Forest Department, Ministry of Agriculture and State Property.
[23] The position was further discussed and supported during the 2nd Congress of Russian Forest Owners and Forest Managers (Lipetsk, 1874) which adopted the resolution to institute model forest management units for dissemination of useful silvicultural knowledge (Бейлин 1962, p. 95).

International Congress on Agriculture and Forestry in Vienna (1873). From the discussions among scientific and academic circles, the issue was transferred to the domain of practical decisions at the high ministerial level. The Ad Hoc Forest Committee drafted, and the Minister approved, a resolution which stated that the Forest Department would take part in the development of forest experiment stations under the Peter Academy of Agriculture and Forestry, St. Petersburg Institute of Agriculture and Lisino Forest School.

Developments after the Vienna Congress on Agriculture and Forestry in 1873

The Vienna Congress advised the governments to initiate the institutionalization and development of forest research and coordinate international efforts in forest experimentation, in particular to investigate the relationship between forests and climate. For that reason and in line with the ongoing development of forest experiment stations in Germany, Austria and France, the first Russian Congress of Forest Owners and Forest Mangers (1875) adopted a decision which motivated the Forest Department to approach the Director of the Peter Academy of Agriculture and Forestry with the proposal to prepare 'considerations' of how to organize a forest experiment station under the Academy.

The key elements of this proposal, which was drafted by V.T. Sobichevskiy, were as follows: The Forest Experiment Station under the Academy should act as a hub or centre, directly and continually linked with secondary or local stations. According to V.T. Sobichevskiy, the leadership of the main and local stations should rest with a Professor of Forest Science. As regards the development of a plan to organize the forest experiment station under the St. Petersburg Institute of Agriculture, the task was delegated by the Forest Department to the Institute itself (Бейлин 1962).

The above mentioned Committee issued an opinion, which was approved by the Ministry of State Properties, to the effect that "it would be very expedient for the national forest agency to take part in efforts to foster empirical forest research and set up forest experiment stations which could be, at first, established under the existing vocational schools: the Peter Academy, Institute of Agriculture and Lisino Forest School." In response, the Forest Department wrote to the Director of the Peter Academy, asking him "to take note of the opinion, consider and define needed measures to set up a forest experiment station under the Academy as well as *decide whom you* (i.e., the Director) *find it possible to entrust the experiments*" (Собичевский 1876, p. 47-48).

This instruction was implemented by the aforementioned vocational schools and their considerations were published in the *Lesnoy Zhurnal* (Forest Journal) in 1876 by Professor N.S. Shafranov (1844-1903) for the St. Petersburg Institute of Agriculture (issue # 2), Professor V.T. Sobichevskiy for the Peter Academy of Agriculture and Forestry (issue # 5) and teacher of mathematics A.S. Shafranov for the Lisino Forest School (issue # 6).

There is historical evidence of the implementation of such instruction in the St. Petersburg Institute of Agriculture: its Board instructed a mission/team to prepare a preliminary report. The team members included: F.K. Arnold (forest mensuration, inventory and planning), D.A. Lachinov (meteorology), N.S. Shafranov (silviculture) and I.P. Borodin (botany and dendrology). In their report, the mission answered the Forest Department's question about instituting the station in St. Petersburg through developing the proposals which were publicized by V.T. Sobichevskiy in 1869.

The mission prepared its Report and proposed to open several laboratories in the central stations, in particular for studies in forestry, forest biology, plant physiology, soil chemistry and physics, zoology and a meteorological laboratory. The Board endorsed it and submitted to the Ministry. But, unfortunately, it did not continue at that time. However, a significant part of that project was implemented in future decades. The project was aimed at organizing forest

experimentation and forest research by setting up experimental forest management units and a forest seed station. The Journal of the Board of the St. Petersburg Institute of Agriculture, published in 1875, preserved this project to the present day (СПбГЛТА 2003, pp. 140-141).

In its Report, dated November 27, 1875, the mission appraised the project, which aimed to set up 22 forest experiment stations in Russia. The Report emphasized the need for "proper organization of experimental activities and observations in Russia," deeming it "necessary to establish an international network for assessing the climatic role of forests and addressing other forestry-related issues." The task was therefore "also shifting from the domain of theoretical speculations to the domain of practical application" (Шафранов Н.С. 1876, p. 86). The project described activities of the stations relating to (i) meteorological observations and (ii) their based natural science and statistic research in forestry.

As regards meteorological observations, it was intended to draw upon the framework used by the Bavarian Weather Stations to measure the temperature and its fluctuations, the air humidity in the forest and in the open field, precipitations, and moisture infiltration in the soil. Measuring ozone contents, atmospheric pressure, wind directions, cloudiness and many other characteristics were also important priorities.

In the area of natural science and statistic research, there was a very long list of challenges, which called for scientific answers that could only be provided by forest experiment stations. Specific challenges included: the need to assess site-specific seed germination capacity (depending on soil conditions), as well as the effects of light admission and soil conditions on yields of various forest products (e.g., timber, gum, tannins); to define the contents of water, ash, and ash chemical compositions in various forest species, for different ages and soils; to understand the influence of various fertilizers on the development of a tree, identify the conditions for the generation of the forest soil cover and assess their impacts on woody vegetation; to monitor the development of pernicious insects and disturbances caused by them to the forest; to conduct mycological studies of tree diseases; to measure soil humidity concurrently with meteorological observations (measurements); to undertake statistical observations related to various forest management practices such as various cultivation methods, natural regeneration of forests, forest drainage and irrigation, various approaches to forest harvesting, cleaning of cutting areas, thinning, pruning debarking, gum tapping, seed harvesting, timber transportation, wood distillation, various methods of growing stock and increment estimation, and methods to measure the solid volume in forest products. According to the mission report, some forestry statistics required observation over larger areas of continuous closed forest and could be effectively made within the Lisino Training Forest Allotment. The Lisino Training Forest Allotment was annually visited by second year forestry students from the Institute, as well as by professors of forestry. Permanent sample plots for such studies should be set aside with precision in forest stands of various types and withdrawn from the total cutting area in the forest management plan for the Lisino Training Forest Allotment (*ibid.*, p. 89).

The intended first step was to set up two central forest stations in Moscow and St.Petersburg, as well as 20 local forest stations in forest management units (*lesnichestvo*) of the following Russian Provinces: St. Petersburg Province (Lisino Forest Management Unit), Province of Livonia (Shlok/1st Riga Forest Management Unit), Province of Courland (Skrunda Forest Management Unit), Grodno Province (Białowieża Forest), Tula Province (Podgorodneye Forest Management Unit), Ryazayan Porvince (Troistskoye/Ryazhsk Forest Management Unit), Vladimir Province (Rozhnov Bor), Chernigov Province (Brovary/2nd Ostyor Forest Management Unit), Penza Province (Zasursko-Selenkinskoye Forest Management Unit), Tambov Province (Romanovka Forest Management Unit), Voronezh Province (Khrenovskoye Forest Management Unit), Simbirsk Province (Big Sura Grove), Ufa Province (1st Minzelinsk Forest Management Unit), Kiev Province (Cherkassy Forest

Management Unit), Yekaterinoslav Province (Great Anadol Forest Management Unit), Yekaterinoslav Province (Leontyev Buerak Forest), Samara Province (Buzuluk Pine Forest/2nd Buzuluk Forest Management Unit), Kherson Province (Novomirgorod Forest Management Unit/Black Forest), Taurida Province (Alyoshki and Soutern-Bank or Beshuy Forest Management Unit) (*ibid.*, p. 93). The above shows that the proposed network of the forest experiment stations would cover a vast area in European Russia, stretching from the western borders of the country to the Urals.

In addition, cost estimates were prepared for setting up 22 forest experiment stations and included the estimated expenses on procuring meteorological, forest mensuration and other tools and laboratory equipment (such as microscopes, scales, and reagents). The total cost estimate was RUR 30,350, as well as annual maintenance and operation costs of the stations, which amounted to RUR 19,340. The cash flows, we must note, were decentralized: "the specified amounts should be earmarked for and be made available to each specific station and accounted for in accordance with the established common financial reporting procedures…" (*ibid.*, p. 93).

Moreover, the mission advised to arrange a study tour for two representatives from the central stations to Prussia, Saxony and Bavaria to become acquainted with their practices of measurement and research in the field as well as to procure needed equipment for all forest experiment stations. Firstly, it would be cheaper to buy equipment there, where it was manufactured; and it would help to establish contacts with German stations, in order to share experience and coordinate actions.

Professor V.T. Sobichevskiy noted in his report that "the forest experiment station under the Peter Academy should be classified as a *central* or *main* facility at least in view of the advantageous geographical location of Moscow; and for purposes of statistical observations to address various forestry issues, it should directly and closely collaborate with *secondary* or *local* stations, instituted in different locations of central, southern and eastern Russia; and similarly, the Petersburg and Lisino stations could be central for the nearest local stations, selected in the Baltic, western and north-western provinces" (Собичевский 1876, p. 48).

Professor Sobichevskiy emphasized that the Moscow and Petersburg projects were, in general, similar and differed only in details. He also emphasized that the station under the Peter Academy could play the role of a local station for the Moscow Province and undertake "all those studies which would be assigned to local stations and deemed feasible, i.e., matching the site conditions and forest status in the Academy's forest or the government forest allotment, nearest to the central station (*the Losinyi Pogonnyi Ostrov*/Moose Island), and namely, to undertake studies within permanent sample plots to measure increment and growing stock in the forest, various experiments, related to forest renewal, cultivation and forest protection" (*ibid.*, p. 49). He also believed that "initially, it would be better to have no more than five or six secondary stations (because errors and mistakes were inevitable at the startup stage). Later, the number could be increased, in a phased manner as the nature and scope of needed research in *Russian* forest statistics were practically identified as well as when the need arose in broadening its scale to cover the nearest local areas" (*ibid.*, p. 49).

He was also against "vesting local forest rangers with meteorological observations because they were not implementable for local forest officers due to their numerous job duties" (*ibid.*, p. 52). He estimated the annual maintenance and operation costs of the central forest station at RUR 8,100-9,100 and those of a local one at RUR 700. This different in costs can be accounted for by the fact that the local stations were only expected to undertake meteorological observations; the other expenditures included in the cost estimate for the central station. The maintenance and operation costs of the 7 stations (1 central and 6 local stations) were estimated at about RUR 14,000-15,000 per year.

The Lisino Forest Management Unit addressed this task in a creative manner with due regard

to the specifics of its status, time and location. The Academic Council of the Lisino Forest School discussed the report, which was prepared by A.S. Shafranov, its teacher of mathematics, with a view to setting up a forest experiment station under the Lisino Training Forest Allotment. The Council deemed it useful and feasible to put in place *a full-fledged experiment station*, consisting of the following three divisions: (a) *meteorology*, (b) forest statistics (subdivided into *silvicultural* statistics and *forest cruising* offices) and (c) *forest engineering* (Шафранов А.С. 1876, p. 55). Meteorological observations had been initiated in Lisino several years before the described developments, and many tools and skills were already available. In addition, the forest surrounding Lisino, had been under "good forest management" since 1840, and the forest management unit had been used to conduct various forest statistic studies for a long time before that. Another advantage was the existence of a forestry classroom, engineering works and laboratory premises in the Lisino School, and availability of specialists in forest sciences who could lead forest statistical observations at the station, which would make them more successful than elsewhere. The annual maintenance and operation costs of the full-fledged forest experiment station were estimated at RUR 3.5 million, and front-end expenses were to be calculated after defining the functions of the station (*ibid.*, p. 55-7).

The research community and practitioners were actively discussing the establishment of the forest experiment stations in Russia, but the final decision was not made until the early 1890s – specifically, until Dokuchaev's Expedition. According to some sources, this delay could be due to "the austerity policy of the beginning of the Russo-Turkish War" (Федотова 2013, p. 433).

Stations or forest management units?

In Russia, the stations were to be managed by the forest administration and their institution turned into a somewhat lingering process.[24] However, forest experiment stations were established in many other countries, including Austria (Mariabrunn, 1874), France (Nancy, 1882), Japan (Nishigahara, 1882, and other 8 stations in 1897), the USA (California, 1887 and other 7 stations in the period of 1908-1913), Switzerland (Zurich, 1888), Hungary (Selmecbánya[25], 1898), Denmark (Copenhagen, 1901), Sweden (Stockholm, 1902), and Italy (Florence, 1910) (Fernow 1911, Орлов 1915, Clupp 1921, Oppermann 1927, Rogers 1951).

The history of the process was reflected in numerous publications of the 1890s about forest experiment stations in other countries in the *Russkoe Lesnoe Delo* (Russian Forest Journal) and *Lesnoy Zhurnal* (Forest Journal). Their authors wrote about the desirability of broadening the forest experimentation in Russia (Орлов 1892, 1893; Огиевский 1895a-d, 1896).

Keen interest in foreign experiment stations arose because Russia had started to develop forest experimentation in its training forest management units and experimental forest allotments earlier than other countries. Different interpretations of the designation of, and operating procedures for, forest experiment stations as well as their studies were not quite comprehensible for Russian foresters: they could not understand why experiment stations were needed if there were training or experiment forest management units (forest allotments).

Unlike the Western European approach to the organization of forest experimentation, Russia notionally differentiated *experimental forest management units* from *forest experiment stations*. G.F. Morozov, who dwelt on the one-sidedness of forest experimentation in Germany, also emphasized that Germany had only central experiment stations whereas at the local level, there were only "forest management units with different established experiments because forest rangers participated in

[24] The training forest management units never ceased conducting experiments and research.
[25] Selmecbánya (Hungarian), or Schemnitz (German), and, now - Banská Štiavnica (Slovak) is a settlement near Zvolen in Slovakia.

forest experimentation in no other way than through assisting the agents of the stations and protecting the areas, while the agents of the stations visited the forest management units only from time to time" (Морозов 1901, p. 323).

In his article about the need to set up an experimental forest management unit in the Bryansk forests, Professor G.F. Morozov developed this thought as follows: "Certainly, one could imagine that instead of the experimental forest management unit, we have a forest experiment station without its own area and only with the right, granted to its Director, to undertake forest research and experiments in different forest management units of a given forest district. Such organization of forest experimentation has such an advantage as simplicity, but it is not expedient in those cases when technical experiments are needed in addition to research work, and this is our case. Experiments with different cutting techniques, different approaches to forest plantation establishment and cultivation require that the experimenting entity should have its own area to be managed by the entity undertaking the experiments. The advantage of the experimental forest management unit is that it provides the investigator with the ownership right, fully enabling the investigator to address technical aspects of local management in a creative manner. But another advantage of the experimental forest management unit is that the above benefits do not preclude performing the functions of forest experiment stations because the Director certainly reserves the right to conduct studies which do not require setting aside an area in neighbouring forest management units. It means that experimental forest management units have a broader foundation than experiment stations. To identify the initial area of an experimental forest management unit, in addition to data of soil, geological and botanical and geographical surveys, it is necessary to take into account recommendations and desires of local actors; and at the same time, short-term goals and objectives for the new experimental forest management unit should be also identified" (Морозов 1906a, p. 292-293).

Nevertheless, organizational issues, including the type, structure or nature of forest studies, should be addressed with due regard not only to the needs, but also more broadly to the culture of the country where forest experimentation either already exists or is only at an early stage of organization. In Russia, it is expressed primarily through government interest to this or that enterprise. For instance, the government embarked on active work to set up experimental forest management units after the droughts in the early 1890s. It was that very period which was referred to by G.F. Morozov as the time of the emergence of forest experimentation in Russia (1892). It means that it coincided with the Special Expedition of the Forest Department. At that time, three governmental experimental forest management units were established (the Mariupol, Derkulskoye and Kamennaya Steppe Experimental Forest Management Units), and the plan of experimental activities was prepared for them together with the existing governmental forest management units – the Shipov Forest and Khrenovskoy Pine Forest management units (Морозов 1901, p. 324).

In Russia, those stations were instituted and managed by the Forest Department whereas in Germany, Austria, Switzerland and France, nine out of the twelve forest experiment stations were under higher schools of forestry. Two stations were under the central forest agencies of the countries, and one was a self-standing facility (Орлов 1896). For that reason, it appeared as if training and experimentation forest management units of Russian forest schools were left outside the network of forest experimentation. Let us have a close look at that situation.

Almost 20 years after the discussion on how to organize forest experiment stations in Russia, Professor M.M. Orlov recommended in his paper *A Project of Forest Experimentation Organization in Russia* that forest experiment stations be set up under higher schools of forestry. In particular, he advised the Ministry of Agriculture and Ministry of State Properties to open such stations in Moscow (under the Institute of Agriculture), St. Petersburg (under the Forest Institute) and Novo-

Alexandria[26] (under the Institute of Agriculture and Forestry). The Institute, he wrote, should develop a program of experimental activities on its own and have it approved by the Forest Committee (Орлов 1896).

Later, such an approach was articulated by G.F. Morozov. He said that only experimental forest management units and forest experiment stations would enable professors of forestry from higher schools to sustain the life-giving link with the forest reality. He further argued that only experimental units and stations would allow forest students to develop skills of scientific cognition and research work in the forest (Морозов 1901, p. 326-327). Professor Morozov pointed out that unlike the German system, Russian forest experimentation had never been one-sided, and the core difference was the existence in Russia of "local stations where scientists could investigate the nature in the field all the year round" (*ibid.*, p. 325).

In 1895, a Special-Purpose Timber Cruising Team was assembled, led by V.D. Ogievskiy. Its key objective was to study renewal of pine and oak forests in south-western Russia (in the Volhynian, Kiev, Chernigov, Orel, Tula and other Provinces) as well as to compile models and volume tables. That team, alongside with the experimental forest management units, gained very specific and, hence, valuable experience of how to operate using "more flexible" mechanisms. To comprehend the essence and designation of these organizations, it helps to look at the definitions, worded by M.M. Orlov later in his fundamental book on forest management:

"A *forest experiment station* (both the most sophisticated central station and the simplest local or special-purpose station) is such an organization of research resources which is aimed at addressing certain silvicultural issues on a scientific basis beyond the boundaries of a management unit and which, accordingly, should not have such an area of forest under its direct management which would require good forest management. A forest experiment station is a permanent establishment, designated for the implementation of experimental activities in laboratories, enterprises and in the field. To operate, a forest experiment station should be staffed with full-time personnel, and equipped with resources for research work; a station operates within a more or less vast area where both experimental and ordinary forest management units are located, and there are wood-processing enterprises and areas of forest drainage operations.

An experimental forest management unit is such an organization of research and development resources which is aimed at addressing certain silvicultural and forestry issues within one definite forest management unit, representing site conditions of a vast area. An experimental forest management unit is an organization, operating on a permanent basis and designated not only for conducting experimental studies in the field and laboratory, but also for making such studies site-specific. To operate, an experimental forest management unit should be both staffed with full-time personnel and provided with a strictly defined area, suitable for good forest management. Apart from research and experiment resources, an experimental forest management unit should also have technical resources for purely managerial work.

An *experimental forest inventory and planning team* is such an organization of research and development resources which is aimed at addressing some silvicultural, forest cruising, assessment and forest inventory and planning issues within a more or less vast forest management district where it operates during one or more, but generally, few years. An experimental forest inventory and planning team is a temporary organization, which ceases to exist upon completion of its assignment.

Activities of all these diverse entities of forest experimentation should be integrated and co-subordinated with a view to meeting all their objectives in the fastest and best way. Activities of all the forest experimentation institutions should be strictly scientific and aiming at investigating

[26] Now: Puławy, a city in south-eastern Poland (Lublin Province).

complex silvicultural phenomena with the use of research methods and identifying causative relationships between the elements, defining the phenomena. The central forest experimentation entity should be part of the central forest agency" (Орлов 1930, p. 262-263).

Considering these aspects of forest experimentation in his foundational book, Professor Orlov stressed the importance of research both for forestry itself and for forest governance. Unfortunately, leaders of the national forest agency and, as a matter of fact, of the country as a whole, have not always recognized it. According to Professor Orlov, within the reviewed period the major organizational flaw of Russian forest experimentation was the absence of a solid foundation. i.e., a special regulation defining its institutional framework and approved by a statute. Experimental forest management units were governed by the same rules as ordinary forest management units and the central entity had to cater to the national forest agency by establishing artificial contacts associated with influential officials. Therefore, when the Forest Department ceased to exist, the life of the organized forest experimentation also ceased, and it was disintegrated. Local experimental forest institutions were re-subordinated to local forest administrations and the central forest experimentation institutions were either closed (as was the case with the forest entomology laboratory) or transferred to the jurisdiction of the Agricultural Department. The latter took place following the establishment of the Forest Division of the Agricultural Research Committee and, later, the State Institute of Experimental Agronomy. Decades later, in 1926, forest experimentation was organized on a new basis under the Forest Department of the Russian Soviet Federative Socialist Republic (*ibid.*, p. 263-264)[27].

It is important to note that when a station was established, it did not necessarily mean that it was made fully operational at once. For instance, the Forest Experimentation Institute in Mariabrunn (Austria), was founded the by the decree of July 8, 1874[28] of the Minister of Agriculture Johann von Chlumetzky. The minister entrusted Arthur von Seckendorf-Gudent, the first Director of Imperial and Royal Forest Experiment Directorate Mariabrunn[29] (1874-1886) to lead forest experiments, in order to develop best practices and to foresee their practical applications in timber production and forest management. The idea of such experimentation forest unit was under discussion since 1868 and came to a practical resolution in Austria in late 1873. According to some authors (True and Grosby 1904), this Institute was not fully developed until 1888 when major laboratories (including its forest seed control station) were established and publishing of proceedings began. Meanwhile, the basis for forest research was established in 1813 when the Imperial Academy of Forestry was inaugurated at the Mariabrunn monastery near Vienna. The professors at the Academy were later moved to the University of Agriculture in Vienna (now BOKU) when the Forestry Program was

[27] The Regulation on Forest Experimentation in the Russian Soviet Federative Socialist Republic, approved by the Decree, dated January 4, 1926, РСФСР.

[28] In 1974, Academician I.S.Melekhov represented the USSR at the 100 Anniversary of the Federal Research Centre for Forests (Mariabrunn, Vienna). Among the honorable guests there were IUFRO President Professor Ivar Samst (Norway) and two former Presidents - Dr. G. Jemison (USA) and Professor Dr. J. Speer (FRG) as well as Director of FAO Forestry Department Prof. Dr. H.-J. Steinlin, President of the German Association of Forest Research Organizations Prof. Dr. C. Wiebecke, future IUFRO President and at that time Division 1 Coordinator Professor Dr. D. Mlinsek representing Yugoslavia and many others (Killian 1977).

[29] „K.K. Forstliche Versuchsleitung" geschaffen, die 1891 in „K.K. Forstliche Versuchsanstalt Mariabrunn" umbenannt wurde. 1962 wurde der Name „Forstliche Bundesversuchsanstalt Wien" festgelegt. Seit 1991 wird „Waldforschungszentrum" hinzugefügt./In 1891, Imperial and Royal Forest Experiment Directorate Mariabrunn was renamed in Imperial Forest Research Institute Mariabrunn. In 1962, the name was changed to Federal Forest Research Centre (FBVA) Vienna. Since 1991, in became BFW – Forest Research Center (Ruhm 1999, p.7). Since 2002 – the new full name reads Austrian Federal Office and Research Centre and Training Centre for Forests, Natural Hazards and Landscape.

opened there. The Institute employed well-known foresters such as Josef Friedrich, who served as its Director for 20 years (1888-1908) and was also the first President of IUFRO. Other foresters who were employed by the institute included: Forest Counsellor Adalbert Schiffel, and Doctors Carl Böhmerle[30], Adolf Cieslar, Norbert Lorenz, Ritter von Liburnau, and Gabriel Janka[31]. By the end of the 19th century, the Institute also employed a librarian, three assistants, three labourers, a consulting entomologist and meteorologist (True and Grosby 1904).

International efforts after the Vienna Congress on Agriculture and Forestry of 1890

Since making their first international contacts to discuss how to share information and findings from experimentation, people working in Russia's existing forest experiment stations felt the need to join their efforts. Their primary reason for this was to develop their own universal "forest language." In other words, they wished to address the issue of forest terminology.

Furthermore, it soon became useful to go beyond a national and regional organization. This would be achieved by uniting stations and countries into an international association. The purpose was to provide opportunities for international cooperation and joint implementation of research activities on a common basis in different countries. It served a second purpose of providing a platform to share views through personal communications, meetings and conferences, publications, forestry literature. Additionally, it served to develop a unified international bibliography. Study tours to other countries to get acquainted with their experimental work, forest management, and other activities would complement those international activities (IUFRO 1936a; Bein 1976).

The first step towards such a union was made in Vienna at the International Congress on Agriculture and Forestry[32] in early September 1890. Prior to the Congress, a report had been prepared regarding a unified approach to the implementation and evaluation of experiments on an internationally recognized basis. The report was presented at the meeting on September 3, 1890 by Dipl. Ing. Karl von Böhmerle from Austria. The report was focused on the following question: *how could the existing forestry experimental system (at least, in countries and territories with overall similar climatic and cultural conditions) ensure uniformity of procedures for using methods and consistency in the application of obtained results, without detriment to the autonomy of individual areas?* (Böhmerle 1890, Friedrich 1894).

The idea was put forward on September 3, 1890, and gained support. The participants of the debate were Professor Adam Schwappach (Eberswalde), Ludwig Dimitz from the Austrian Ministry (Vienna), Senior Foresters Schuberg and Weise, Forester Sprengel, Adjunct Karl Böhmerle, and Professors Adolf von Guttenberg and Ernst von Ebermayer. After a substantive discussion, a decision was made, and it was presented to the Congress by Forester Carl Schuberg from Karlsruhe, Germany (Proskowetz 1890, Friedrich 1894):

1. To pave the way for uniform principles and common arrangements in forest research and publications, a Committee should be set up and shortly thereafter convene a meeting of delegates from the states which took part, and those who wish to take part, in forest experimentation.

2. This Committee shall take into account other points raised during the negotiations.

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[30] Carl Böhmerle was the person who posed the question at the 1890 Vienna Congress, "what can be done to make forest research international comparable", which provoked the German initiative to start the IUFRO Statutes development. See further down details.

[31] Almost all of them, except of Dr. Carl Böhmerle, took the burden to be a Director of Mariabrunn in different years.

[32] Internationaler land- und forstwirthschaftlicher Congress.

3. This Committee should include the Directors of the following research institutions: Boppe from Nancy (France), Bühler from Zurich (Switzerland), Danckelmann from Eberswalde (Germany), Friedrich from Mariabrunn (Austria), and von Söltz from Schemnitz (Hungary).

This decision called on the Committee members to hold international meetings of forest researchers/scientists in order to develop standardized guidelines and common formats of research and of publication of their results (Böhmerle 1890; Friedrich 1894).

Since the decision was made in Austria, it was a matter of honour for the Austrian Imperial Forest Research Institute Mariabrunn to take the lead in its implementation. Therefore, on May 5, 1891, Chief Forester Friedrich sent a letter to the Committee Members to suggest convening the first meeting of the Committee in conjunction with the annual meeting of the Association of German Forest Experiment Stations, which was scheduled for September 1891 in Badenweiler, Germany.

The proposal was unanimously approved by the Association, and its Chairman Professor Danckelmann (Eberswalde) informed J. Friedrich about it in his reply, dated July 19, 1891. In addition, he outlined organizational arrangements for the meeting: Professor Bühler (Zurich) was to take care of the Members of the Association on September 7-14 in Switzerland, after which they were to depart for Badenweiler on September 15 to take part in the Meeting of the Association of German Forest Experiment Stations, which was scheduled for September 16-19 and included a visit to experimental plots.

In addition, an invitation was sent to Professors Boppe (Nancy) and Söltz (Hungary). In his letter dated August 5, Professor Söltz replied that he supported all the initiatives, but would not be able to attend the meeting because he had been appointed Director of Marmaros-Sziget Forests[33] (Friedrich 1894).

[33] Now, it is Județul Maramureș in Romania.

Chapter 3
Statutes (September 18, 1891, Badenweiler) and the Establishment of the Association (August 17, 1892, Eberswalde, Germany)

On September 18, 1891, the Working Group met in Badenweiler at a regular assembly of the Association of German Forest Experiment Stations and drafted statutes for a new international organization. The participants of the meeting were Assistant Director L. Boppe (Nancy), Doctors A. Bühler (Zurich), B. Danckelmann (Eberswalde), C. Schuberg (Karlsruhe), J. Friedrich (Mariabrunn), Professor A. Schwappach (Eberswalde) and Forest Inspector E. Huffel (Nancy). On that day, upon completion of preliminary and final consultations, the Committee expressed the need for joint studies and drafted documents to that effect: the Protocol and the Statutes of the organization (IUFRO 1891).

According to the Protocol, the Committee conducted negotiations in compliance with Paragraph 6 of the Decision of the International Congress on Agriculture and Forestry in Vienna, to initiate an international agreement on the establishment of the transnational forest research network. These negotiations resulted in the creation of the International Association of Forest Experiment Stations and the drafting of its Statutes. It was decided that the Committee Members would discuss the draft Statutes with stakeholder governments and seek their approval. Following the governments' approval, the Committee (Professor Bühler) would be notified. Decisions on the dates and venue of the next assembly would be announced later. The Protocol was signed by L. Boppe, A. Bühler, Dr. B. Danckelmann, J. Friedrich, C. Schuberg, Dr. A. Schwappach and E. Huffel (IUFRO 1891).

The draft Statutes were handwritten in German and French and contained only six articles (IUFRO 1891; Friedrich 1894)[34]:

Draft Statutes

§ l. The purpose of the International Association is to promote, further develop and improve forest research work.

This goal will be pursued by acquiring knowledge of the experimental work undertaken in the different countries, visiting experimental plots, discussing of research methods and exchanging publications.

§ 2. Members of the association: the Association of German Forest Experiment Stations, and experiment stations from France, Austria and Switzerland.

Experiment stations other than those designated above may join the Association by means of a simple declaration as signified by the Chairman of the Association.

§ 3. The location and time of the next Assembly shall be determined at each meeting.

§ 4. The Chairman of the Association shall be the Director of the Experiment Station in the country where next the meeting is to take place. The activity of the managing director begins when

[34] The translation into English was made from both French and German languages.

the location of the next meeting is determined by the Assembly, pursuant to § 3 decision, and ends when the decision on the date and place of the subsequent meeting is determined[35].

§ 5. The use of German and French language shall be optional in the deliberations.

§ 6. The Minutes of each meeting shall be published in both languages by the care of the Chairperson.

Read and signed by*: L. Boppe, A. Bühler, Dr. Danckelmann, C. Schuberg, Friedrich, Dr. Schwappach, E. Huffel in Badenweiler, September 18, 1891*.

On August 17, 1892, the International Association (Union) of Forest Experiment Station was founded in Eberswalde, Germany (Friedrich 1894). Interestingly, the word *Eberswalde* is translated from German as "wild boar forest", and *Badenweiler* means "a bathing village" in German[36].

The citations are extracts below are from the meeting Minutes[37] of the Association of German Forest Experiment Stations. The stations in this Association were located in different kingdoms and principalities of Germany, such as Alsace-Lorraine, Baden, Bavaria, Braunschweig, Hessen, Prussia and Württemberg. Experimental stations from Austria and Switzerland also participated.

That meeting had only one session which was attended by F. Krutina (Baden), K. Kast (Bavaria), L.W. Horn (Braunschweig), C.E. Ney (Alsace-Lorraine), K. Wimmenauer (Hessen), B. Danckelmann, A. Schwappach and K.Fricke (Eberswalde, Prussia), C.J.T. Lorey (Württemberg), J. Friedrich and R.L.R. von Liburnau (Austria), and A. von Bühler (Switzerland), as well as W. Weise (Hann. Münden, Saxony) who was invited as a guest.

Based on the decisions of September 18, 1891 (Badenweiler), the participants from various forest experiment stations requested their respective governments to endorse the draft Statutes of the International Union of Forest Experiment Stations (IUFRO 1892c, p. 2). As agreed, the results of the previous negotiations were sent to Professor Bühler from the Swiss Forest Experiment Station at Zurich. They provided a basis for considering the creation of the Union at the meeting of the Association of German Experiment Station at Eberswalde.

Professor Bühler moderated the meeting and reported on the situation and the work done. In particular, he pointed out that even though not all participating German States had formally authorized their Forest Experiment Stations to give consent to the accession of the Association of German Forest Experiment Stations to the International Association, but it was unlikely that the missing approvals would not be given. The governments of Austria and Switzerland gave their consent to the accession of their Forest Experiment Stations to the International Union. The government of Hungary was not able yet to identify its position on the matter. However, according to information from high-level sources, Hungary would also join the International Union within one year. At the moment, the negotiations were still underway with France to decide if and when its membership could become a reality. Professor Bühler remarked that the Swiss government was willing to invite France via diplomatic channels to join the Union (IUFRO 1892c, p. 2).

Further, the German participants (Horn, Kast, Danckelmann and others) explained the

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[35] In other words, the Chairman's term extends from the end of one Assembly, until the end of the subsequent Assembly.

[36] The famous Russian playwirit and short story author Anton Pavlovich Chekhov passed away in this place on July 15, 1904.

[37] Based on a document from the Library of the Forest Academy at Eberswalde (Archive number: Zu A 6034). Further on cited as *IUFRO (1892c) Minutes of the meeting at Eberswalde 17 August 1892*/Meeting of the Association of German Forest Experiment Stations [including participation by Austria and Switzerland] at Eberswalde in 1892. 6 pp., which is based on the handwritten documents (see References IUFRO 1892a,b,c).

position of their States[38] on their accession to the International Association, and the meeting proceeded to the decision-making. It was unanimously decided that: 1) the Association of German Forest Experiment Stations, the Austrian and Swiss Experiment Stations would found the International Association of Forest Experiment Stations according to the draft Statutes agreed on September 18, 1891 at Badenweiler, and upon approval of their governments; 2) the International Association of Forest Experiment Stations considers the membership of other countries, particularly, France and Hungary, to be desirable. Regarding this membership, representatives of the Austrian and Swiss Experiment Stations were going to take further steps.

The future International Union of Forest Research Organizations (IUFRO) was founded as an intergovernmental alliance because its members were States, represented by forest research institutions. At that time, Germany was represented by independent members for German Lands (States) both in the German Association and the emerging International Association. This arrangement was largely due to the historical development of Germany. Before its political and administrative unification into a single nation, German kingdoms, duchies and principalities had been split in two groups: the North German Confederation (Prussia, Saxony, Braunschweig, Saxe, etc.) and the Southern German Union (the German States located to the south of the Main River: Bavaria, Baden, Württemberg, Hesse-Darmstadt). The German Empire was proclaimed in Versailles, on January 18, 1871, but nevertheless, forest issues were dealt with in a more traditional conservative way. Each German Land (Province) had a degree of independence, which is largely preserved to date in a form of federal states (German: Bundeslands, Lands).

Chief Forester J. Friedrich (1892-1893)[39] from Austria was elected Chairperson of the newly founded International Association of Forest Experimental Stations. He proposed to hold the next meeting of the Association in September 1893 in Vienna.

Among participants of that momentous meeting were internationally recognized foresters such as Professors Wimmenauer (Hesse), Lorey (Württemberg), Schwappach (Prussia), and also such future IUFRO leaders as Chief Foresters Friedrich from Mariabrunn, Danckelmann from Prussia and Professor Bühler from Switzerland.

* * *

IUFRO Congresses, but not its activities, were twice interrupted by the World Wars and could not be always held regularly - once every 3-5 or more years. Only in the late 20th century was a relatively regular schedule of Congresses established to hold them at 5-year intervals, taking into account the years of the World Forestry Congresses under the aegis of the UN FAO. The inter-Congress interval could be either decreased or increased upon agreement between IUFRO and the FAO. Over time, IUFRO's objectives, structure, names and logos changed, the number of its member organizations grew, and the geography of its coverage and Congress venues broadened.

How was the Union developing in those years?

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[38] For example, Bavaria was not a member of the Association of German Forest Experiment Stations and wished to join the International Association as an independent state. Chief Forester Danckelmann explained that according to the Badenweiler agreement, it was not feasible. In his reply to Dr. Kast from Bavaria, Assistant to the Minister, Senior Forester Dr. Viernstein said that the Bavarian government had no intention to prevent the Association of German Forest Experimental Stations from joining the international association (Friedrich 1894, p. 12-13)

[39] Referring to IUFRO leaders here and further on, the years of their office holding are shown in brackets.

Chapter 4
Congress I – September 10-16, 1893, Vienna, Austria

This Chapter builds upon information from the Report of the I Congress of the International Association of Forest Experimental Stations, which was held in Mariabrunn, Vienna. The report was published by the Publishing House of Wilhelm Frid (IUFRO 1893a) and the overview of the first years of IUFRO was made by its first President J. Friedrich (Friedrich 1894).

The venue and dates of the Congress had been determined beforehand; therefore, on July 23, 1893, J. Friedrich sent invitations to the meeting[40] (IUFRO 1893b). The invitations read as follows:

The Distinguished Executives of the Association of German Forest Experiment Stations at Eberswalde

By Decree of 18 July 1893 L12268/1621, the Imperial-Royal Ministry of Agriculture authorized me to invite the Forest Experiment Stations of Prussia, Saxony, Bavaria, Württemberg, Baden, Hesse, Brunswick and the Government of Alsace-Lorraine, which have all already subscribed to the International Association of Forest Experiment Stations, to attend the First Assembly of the aforementioned Association, which will take place September 10-16, 1893, in Vienna-Mariabrunn.

In reference to the highly esteemed telegram we received today, I feel honored to approach the Distinguished Executives of the Association of German Forest Experiment Stations with the polite petition to initiate the necessary steps and present the invitation to the governments of the above-mentioned states. To this end, I attach 40 copies of the program and 8 copies of two protocols signed in Badenweiler and Eberswalde.

Please kindly let me know the names of gentlemen-delegates in due course.

Mariabrunn, Post Office Weidlingau in Vienna, July 23, 1893.

Friedrich, Imperial-Royal Oberforstrat (chief forester) and currently Chairman of the International Association of Forest Experiment Stations

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[40] An die sehr geehrte Geschäftsleitung des Vereines deutscher forstlicher Versuchsanstalten in Eberswalde

Mit Erlass vom 18. Juli 1893 L12268/1621 hat mich das hoh. k. k. Ackerbau-Ministerium beauftragt, die forstlichen Versuchsanstalten Preußens, Sachsens, Bayerns, Württembergs, Badens, Hessens, Braunschweigs und der Elsass-Lothringen'schen Regierung, welche bereits sämtlich dem internationalen Verbande forstlicher Versuchsanstalten beigetreten sind, zur ersten, in der Zeit vom 10.−16. September 1893 in Wien-Mariabrunn liegenden Versammlung des oben genannten Verbandes einzuladen.

Mit Beziehung auf das wohldortige geschätzte heute hier eingetroffene Telegramm beehre ich mich mit dem höflichen Ersuchen, die sehr geehrte Geschäftsleitung des Vereines deutscher forstl. Versuchsanstalten wolle wegen Einladung der Versuchsanstalten der vorgenannten Staaten das Geeignete gefälligst veranlassen und lege ich zu diesem Behufe 40 Exemplare des Programmes und je 8 Exemplare der zwei zu Badenweiler und Eberswalde unterzeichneten Protokolle bei.

Die Namen der Herren Delegierten wollen mir gefälligst rechtzeitig bekannt gegeben werden.

Mariabrunn, post Weidlingau bei Wien am 23. Juli 1893.

Friedrich, k. k. Oberforstrat und d.Z. Obmann des intern. Verbandes forstl. Versuchsanst.

[The authors are grateful to Dipl. Ing. Heinrich Schmutzenhoffer for his help in translation of this document].

Overview

Invitations were sent to the three founder-countries – Austria, Switzerland and Germany (the German Forest Experiment Stations of Baden, Bavaria, Brunswick, Hesse, Prussia, Saxony, Württemberg) as well as to Hungary, Italy, Russia, France and Sweden.

Despite receiving an invitation and although they had participated in drafting the Union's Statutes, representatives of Bavaria did not attend the Assembly. They said that they could not attend because of the summer holidays and the bureaucratic hurdles at the level of the Ministry of Finance, where they had sought support for the trip. Russia, Sweden and France did not come either. France intended to send several members of the faculty of the School of Forestry and Experiment Station in Nancy, but also failed to do so because of the holidays (Friedrich 1894).

In view of the historical importance of the meeting, it would be worthwhile to list all the participants:

1. Austria (5 participants) – Chief Forester Josef Friedrich, Forester Fritz Wachtl, Adjunct Karl Böhmerle, Doctors Adolf Cieslar and Eduard Hoppe – all from Mariabrunn
2. Germany (7) – Professor and Chief Forester Carl Schuberg, Karlsruhe, Baden; Councillor Horn, Braunschweig; Forest Government Official Carl E. Ney, Strasburg, Alsace- Lorraine; Councillor and Professor Richard Hess, Giessen, Hessen; Forester and Professor Adam Schwappach, Eberswalde, Prussia; Senior Forester and Professor Max Kunze, Tharandt, Saxony; Professor Tuisko Lorey, Tübingen, Württemberg
3. Hungary (4) – Minister Julius v. Söltz, Marmaros-Sziget; Forest Director Arthur F. von Feilitsch, Klausenburg[41]; Forester Gustav Tavi, Pest [42]; Professor Eugen Vadaš , Schemnitz;
4. Italy (1) – Forest Inspector Giovani Battista Ciucci, Belluno, Venezia
5. Switzerland (1 participant) – Professor Anton Bühler, Zürich
6. In the evening of September 10, 1893, almost all participants gathered at the round table in the Hotel de France.

Scientific Program

Five presentations were made at the two sessions of this historic meeting. Most of the time, however, was devoted to discussion of the Statutes of the Union. Visits to forest sites were also included in the program, and consisted of four excursions (Friedrich 1894, p.15):

- September 10. Arrival of participants in Vienna. Convivial Association at the Hotel de France.
- September 11. 9:00 a.m.: the first session in Mariabrunn. In the afternoon: visiting the Imperial Forest Research Institute in Mariabrunn and the local experimental gardens.
- September 12. Visit to the thinning experimental plots in (1) the property of Excellency Count Ernst Hoyos' Forest land on soapstone and in (2) the so-called 'Great black pine forest' in the municipality Wiener-Neustadt. The visit included, demonstrating and planting experimental sites located in the same forest.
- September 13. Visit to the Vienna forests in the Pressbaum and Lammerau forestry districts, including experimental plots of fir stands and experimental thinning areas.
- September 14. Visiting the Imperial Forest Research Institute, museums and Lainzer Tiergarten (fenced royal hunting area).
- September 15. Visiting the Imperial Vienna forests in the Purkersdorf forestry district –

[41] In German; in Hungarian: Kolozsvár or Kolozs megye, a city in Transylvania. Now: Cluj-Napoca, Romania.
[42] Now – Budapest.

specifically, growth and thinning experiment sites in beech stands, and experiment sites of softwood plantation.

- September 16. At 9 clock in the morning – closing session in Mariabrunn.

The Assembly began its work on September 11, 1893 at 9 a.m., in the Mariabrunn Conference Hall with the adoption of the agenda. At the entrance, the participants could see a brief history of the Union: Vienna 1890, Badenweiler 1891, Eberswalde 1892, and Mariabrunn 1893 – a short history of the Association. In the hall, there were flags of the participating countries and it was decorated with flowers as a sign of hospitality. There were also portraits of the Emperor and other prominent people. The first meeting was attended by 15 officials from five countries, including Hungary and Italy (Friedrich 1894, p. 46).

The day's agenda included three items:

1. Welcome addresses and information.
2. Measuring the height of trees on hillsides. Speaker: Professor T. Lorey; co-speaker Adjunct C. Böhmerle.
3. Uniform nomenclature in wood measuring; theory of the timber growth and yield. Speaker: Professor A. Bühler.

Highly recognized foresters and economists warmly greeted the meeting, hosted by Austria, in the morning of that sunny autumn day.–After reading the congratulatory letters, J. Friedrich, Chairman of the Union, asked his colleague Forester Wachtl to act as a moderator of the meeting and Dr. Hoppe from Mariabrunn to be the rapporteur of the session.

Under the first item of the agenda, Minister Julius von Söltz delivered his welcome speech and expressed his hope that the Hungarian Government would not object the entry of its Forest Experimental Station into the International Union, and that such entry would take place soon. The next speaker was one of the elders of the Association of German Forest Experiment Stations – Professor Schuberg. Schuberg stressed that the decision to establish the International Union had not been spontaneous (Friedrich 1894, p.48); on the contrary, the decision had been preceded by years of advocacy around the format and purposes of such an alliance. He expressed gratitude to the Association of German Forest Experiment Stations for its great preparatory work.

Under the 2nd item of the agenda (height measurement), Professor Lorey (Germany) reminded the attendees that the issue of measuring trees had been raised at previous meetings, but it took time to understand the necessity of additional studies. In particular, he pointed to the importance of the height at which tree diameters were measured (especially with the root system rising above the surface), as well as the height of a tree on a slope for the estimation of the trunk volume, and hence the cost of wood. One of the main questions was whether to measure the diameter at breast height (d.b.h. at 1.3 m) at a point where the axis of the trunk went out of the ground, or on the side adjacent with the image point, or at a point where the root supported the tree in the ground[43].

Professor Lorey then talked about revealed errors in different measurements, including measurements at different ages and for different tree species—for instance, the impact of thickening at the bottom of spruce tree trunks. Deviations in the calculations might reach 14.5%, although most of them did not exceed 8%. For that reason, it was proposed to standardize the measurements and introduce specific reduction factors based on the diversity of the landscapes for converting the results. The report provoked a stormy debate, which was contributed to by almost all participants. In conclusion, Professor Lorey noted that the debate had shown the availability of data for a comprehensive answer to the question and that it was necessary to continue the research (Friedrich 1894, p.72). After the break and excursion to the botanic garden, the meeting resumed its work.

[43] Later, the approach of measuring d.b.h. started to be referred to as canonical.

The second session covered the 3rd item of the agenda (nomenclature standardization for tree measurements). Professor Bühler made the report. He noted that in books and magazines, abbreviation of names and technical terms highly complicated one's understanding of the subject (Friedrich 1894, p.73). In the literature, there were forest denominations, accepted by the community and widely used, such as the description of Kraft's crown classes. Therefore, it would be desirable to have an appropriate nomenclature (terminology) to be used in publications of forest research organizations.

Then, Professor Bühler proposed to divide the denominations (terms) for individual trees and stands and to introduce general terms for the most common formulas, based on four principles for designing the nomenclature of parameters for tree trunk mensuration:

1. Only common and constantly repeated formulas obtain the corresponding terms and symbols. Thus, all the formulas, named after the authors, remain unchanged (Pressler, Schneider and others);

2. All terms which are in use must be preserved unless they coincide precisely and unambiguously, or are mixed with other similarly sounding expressions;

3. It is necessary to take one term and abbreviation that is common and most frequent in the literature. If it is possible, existing expressions (symbols, terms) should be used instead of introducing new ones unless absolutely necessary;

4. Special note: Everything pertaining to individual trees is to be indicated by lower-case letters, and everything related to tree stands – by capital letters.

Professor Schwappach endorsed the general ideas and principles of such a nomenclature, and recommended the Chairman of the session to let scientists study those proposals (44 paragraphs) and prepare suggestions for further discussion. It was also noted that nomenclature issues had been identified at the meeting of the Association of German Forest Experiment Stations in 1885 in Görlitz. Professor Kunze said that scientists should use conventional (such as in mathematics) symbols as much as possible without forgetting their function. Almost all participants made comments. The speakers did not reject the proposed approaches. Nevertheless, upon voting for the proposals of Professor Bühler, paragraph 1 was excluded. Paragraphs 2 and 3 were adopted after clarifications. Paragraph 4 was left open for further discussion.

This was the first time that the research community proposed (and later adopted) internationally unified denominations, nomenclature and symbols to denote various characteristics of trees and tree stands, harvested wood products, and brushwood, as well as formulas. It was decided to set up a special commission to continue the work at the nomenclature. After voting, Professors Böhmerle, Kunze and Schuberg were included into the commission. The session was closed at 1:00 p.m.

The second session was opened on September 16, 1893 at 8:10 in the morning. It was attended by 15 participants. The remaining five issues on the agenda for that day were:

1. Results of experiments in the forest garden and the need for reliable and uniform qualitative identification of selected plants. What criteria should be used? Speaker: Adjunct Dr. A. Cieslar; co-speaker: Professor A. Bühler.

2. Are the annually recurring demands of European countries for forest seeds and promotion of natural selection of forest seeds met, and how do international agreements ensure the most reliable way of obtaining seeds of known provenance and best quality? Speaker: Adjunct Dr. A. Cieslar.

3. Measurement of the rainwater flowing down on the tree trunk. Speaker: Forest Government Official C. Ney.

4. Dates and venue of the next meeting.

5. Miscellaneous; indicative agenda for the next meeting.

At the beginning of the session, the Chairman read congratulatory letters. Then, the participants discussed the need to publish the report of the Assembly in French as required by the Statutes of the Union. It was unanimously decided that although the French language had been specified in the Statutes at the request of France's representatives, the German language was the main working language of the meeting. The report would thus be published only in German to avoid high costs of translation and printing (unanimously endorsed).

Under the 4th item of the agenda, Dr. Cieslar supposed that results of experiments were signifycantly dependent on the characteristics of the studied plants. The most important characteristics were diameter, height, volume (mass), weight, weight of dry matter, root and crown development, stem colour and leaf colour. Based on numerous experiments, he concluded that there were only two critical factors affecting the quality of a plant: its weight (mass) of dry matter and height. The combination of these indicators was more reliable than the diameter and height combination.

Professor Bühler from Zurich expressed the view that plants' characteristics were very important as they enabled researchers to avoid confusion when conducting experiments in different places. According to his observations, the dry weight and height might vary. To be more specific, it was necessary to describe the appearance of the plant, including its shape and color. Dr. Cieslar explained that he intended to use this observation as an important factor for the description of plants in other documents.

The afternoon session was dedicated to seed origin.

Under the 5th item of the agenda, Dr. Cieslar presented calculations, demonstrating that it was more profitable to use seedlings from seeds collected in the same country, compared to seeds purchased in other regions. Professor Hess underlined that seeds harvested in Germany were much cheaper than in any other region. Professor Bühler mentioned that the work with seeds was not easy. Professor Schwappach interrupted the discussion by saying that this topic was not central to forestry research. However, the participants concluded that many Austrian forests originated from self-seeding; and stands from seeds imported from other regions should and would be carefully studied, as those seeds were collected in different soil and climatic conditions.

The 6th item of the agenda (about precipitation measurement) provoked a lively discussion among the participants. Forester Ney presented his findings from observations since 1870. He published an article[44] which showed how the scientific observations had led to the conclusion that approximately 23.6% of rainfall water was retained in the tree crown. Dr. Cieslar added that only about half of the 23.6% went to the soil. Dr. Hoppe and other participants were unanimous in their opinion that the research should be further developed and continually monitored (IUFRO 1893a).

Organizational matters

At the end of the meeting, some organizational issues were addressed (agenda items 7 and 8), specifically the dates and place of the next meeting. Dr. Schwappach suggested holding it in Germany, and when almost all participants agreed with him, he officially announced that the second assembly of the Union would be held in Braunschweig, Germany, in 1896.

As a final comment, Josef Friedrich suggested that it be desirable to identify critical issues or matters to be discussed at the next meeting and reflect them in the Minutes, in order to simplify the preparation for the next meeting and avoid the need to start from scratch. This would enable participants to become better prepared for the next Congress as they would know the subject of discussion beforehand.

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[44] *Der Wald und die Quellen* (The Forest and the Sources) – An article in the *Aus dem Walde* Weekly, published in Tübingen in 1893.

Professor Bühler's report provided a framework for setting up the Commission on Forest Terminology. The Commission included Professors Schuberg from Karlsruhe and Kunze from Tharandt, and Adjunct Böhmerle from Mariabrunn.

Professor Bernhard Danckelmann, Chief Forester of Prussia, was elected Chairman of the Union (1894-1896).

At about 5:00 p.m., all participants gathered for the farewell dinner in Vienna. They wished for forestry's prosperity, and for fruitful discussions in the future (IUFRO 1893).

Resolutions:

No formal resolution was adopted, but the report highlighted common recognition of all issues discussed at the first Congress, as well as the need for further research development. The following topics were considered:

- Measuring the tree stand age: how to measure it and the critical factors to consider when determining the age of a tree;
- Measuring the diameter of a tree at a certain height;
- Nomenclature standardization for measurements and calculations;
- Plant description: dry weight, height and appearance;
- Visiting sites of experimenting with light admission, shading, crossbreeding and other factors.

In addition to the scientific objectives, the following ways were identified to improve the experimentation settings so that they yielded more professional results:

- Clear objectives of each experiment should be established and, in particular, conditions for its implementation should be defined, before undertaking a study;
- Clear boundaries for the experiment should be defined;
- Discussions of the nomenclature standardization should be continued to avoid confusion in the future;
- International standards should be developed to enable anyone to use them in experiments and obtain internationally applicable results.

Excursions

On September 12, after the morning session and lunch, a three-hour excursion was held to the botanical garden, experimental forest and meteorological station. The botanical garden occupied almost 2.1 ha out of the 5 ha of the total Mariabrunn area. At that time, the collection consisted of about 440 species (including sub-species, varieties and hybrids) of European and exotic trees and shrubs, supplied with inscriptions of their Latin names.

During the tour, Professor Friedrich demonstrated his experiments to establish relationships between the time of the resin movement and flower quality and their influence on the size and quality of pinecones. He also demonstrated his experiments related to the influence of pine seedlings size on the first flowering. Dr. Cieslar showed his experiment to assess plant growth under different conditions (i.e., soil composition, natural and artificial shading, and transplanting after the first year of growth). Then, the participants saw various meteorological instruments and devices for measuring the temperature, light, and density.

On September 13, the field trip led the participants to forests near Vienna. During this visit, Forester Hampel demonstrated an experiment with thinning intensities in 20-year-old plantations of the black pine (*Pinus nigra*) (3 levels of thinning intensity), and a 57-year-old black pine area (four levels of thinning intensity). Dr. Cieslar showed the results of the humification process and its impact on sowing practices. Then, Dr. Schindler and Forester Melzer showed 50-year-old beech stands. The participants praised the demonstrated results.

On the next day (September 14), there was an excursion to Mariabrunn laboratories where the delegates got acquainted with various devices and technology. These included two types of dendrometers, invented in the 1890s, and an anemometer, which was the most impressive device, shown by J. Friedrich in his laboratory. Professor Friedrich and Professor Böhmerle wrote the manual for the device in the early 1890s. Dr. Hoppe's laboratory displayed a machine invented by Nowacki-Borchardt for soil analysis. The participants also visited the chemical laboratory, where installations for water desalination, as well as measurement of nitrate and humus content took place. In Dr. Cieslar's laboratory, the participants saw various microscopes and equipment for measuring the diameter of a stem, weight of dry wood, dried leaves, as well as scales to weigh tree trunks. Visitors could see about 350 different tools from different regions for working with conifer seedlings and young plants. In addition, Dr. Cieslar showed the laboratory's *salitsetum* – a collection of 48 willow species, which was gifted by Professor Hartig from Munich (Friedrich 1894, p. 45).

Adjunct Böhmerle showed his collection of tree trunk cross-sections, which were intended, as a rule, to measure annual rings. He demonstrated his trial and error method of assessing the conditions for storage of European black pine timber. He also showed the visitors his books on reforestation, and irrigation and other experiments. During the tour, the participants saw and learned about many books, brochures, handbooks and manuals with description of devices, equipment, and technology, as well as sketches of experimental sites.

On the last excursion day (September 15), participants visited Gablitz, which was located at a distance of about 20 km from Vienna. The tour was organized and led by Dr. Schindler, Mr. Ziegelbauer, Forester of the City of Vienna, and Mr. Hackenberg, Local Forest Administrator, with inputs from Dr. Cieslar, who gave explanations about reforestation areas and Adjunct Böhmerle, who gave explanations concerning thinned stands.

Areas of the Scots pine (*Pinus sylvestris*) from Austria and Sweden gave participants an opportunity to evaluate the growth of trees of different provenances. Nearby, there were plantings of the black walnut (*Juglans nigra*), American ash (*Fraxinus americana*), California maple (*Acer californicum*), white pine (*Pinus strobus*), white hickory and Amara (*Carya alba, C. amara*), red oak (*Quercus rubra*) and Virginian juniper (*Juniperus virginiana*).

Participants became interested in an experiment involving beech plantings, grown under four different light conditions. On the second, third and fourth areas, the light admission rates were, respectively, 0.8, 0.65, and 0.5 of that on the first area. It was discovered that the difference in light admission affected the growth of plants.

Russian participation

Russia did not participate in that Congress. This could be accounted for by belated arrival of the invitation or preoccupation of the Russian research community with the struggle against the terrible famine of 1891-1892.

Chapter 5
Congress II – September 19-24, 1896, Braunschweig, Germany

Information for this Chapter was mainly drawn from the Minutes of the Second Congress of the International Union of Forest Experiment Stations, printed in Braunschweig by the Trade and Publishing House of J. Krampe in 1897 (IUFRO 1896)[45].

Overview

In keeping with the decision of the First Congress, the meeting was held as scheduled. The local Forest Experiment Station was commissioned by the Duchy of Brunswick to host the meeting of the Union on September 19-24, 1896 in Braunschweig. As the meeting was prepared in cooperation with the Association of German Forest Experiment Stations, the invitation was sent on behalf of the latter. The number of participants was about the same as that of the previous meeting. Due to adverse circumstances, the hope to increase the number of members of the Union was not fully realized.

The Congress brought together 16 representatives from 5 countries, and the Minutes were drawn up by two technicians – forest experts Salle and Holzberg.

The delegates of three founder countries participated in the meeting:

- Austria (2 persons): Adjunct Böhmerle and Dr. Hoppe;
- Germany (11): Councillor Krutina (Baden), Professors Ebermayer[46] and Mayr (Bavaria), Lorey (Württemberg), Wimmenauer (Hesse), Müttrich and Schwappach (Prussia), Privy Councillor Horn (Braunschweig), Chief Forester Schuberg[47] (Karlsruhe) and Chief Forester Danckelmann, Privy Councillor Professor Kunze (Saxony);
- Switzerland (1): Professor Bühler.

Non-member countries were represented by: State Councillor Tichonoff (Tikhonov)[48] from the Forest Department (Petersburg, Russia) and Mr. Holmerz, Director of the Stockholm Institute of Forestry (Sweden).

The agenda included research reports, excursions, as well as decision on the dates and place of the next meeting.

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[45] Some sources (Лесная энциклопедия 1984, IUFRO 1992, Страхов, Писаренко, Борисов 2001, p. 208) and the IUFRO website (accessed on May 1, 2014) erroneously refer to the year 1897 as the year of the Congress. In addition, on the first page of the Congress Report, there is also an error in the Congress dates: September 14-17, 1896. This date is indicated correctly by Ilvessalo (1977). From other side, Scheuble (1948) pointed – 1895.

[46] He did not participate in the concluding session.

[47] His name was missing in the list of participants (IUFRO 1896, p.1), but was twice mentioned in the agenda as a speaker (*ibid.*, p. 2).

[48] Vasiliy A. Tikhonov (1849–1913), State Councillor, Head of a 'Desk' (Head of an Office) and Vice-Director of the Forest Department of the Russian Ministry of Agriculture and State Property.

Scientific Program

On Friday, September 18, the participants met for dinner, and on the next day, September 19, the first session began at 8:30 a.m. The scientific program included eight items:

1. Report by the Swiss Forest Experimental Station on the previously published materials about the ranges of the main tree species. Speaker: Professor Bühler;

2. Progress report on the main tree species distribution surveys. Speaker: Professor Schwappach;

3. Tree species ranges and respective data processing (Swiss Forest Experiment Station);

4. Should we continue to use the same observation methods in forest meteorology or should we alter the current system? Speaker: Professor Müttrich, Co-speaker: Dr. Hoppe;

5. Resolution on the proposals from the Commission on Forest Terminology. Speaker: Senior Forester Schuberg;

6. Age dating in a growing stock sample. Speaker: Professor Lorey;

7. Tree height measurements on hillsides. Speaker: Senior Forester Schuberg, co-speaker: Adjunct Böhmerle;

8. Resolution on the dates and venue of the next meeting of the International Association of Forest Experiment Stations.

Per request of the Chairman, it was decided to start the discussion with the 4th item of the agenda. Participants were supplied with handouts, which was disseminated by Prof. Müttrich and Dr. Hoppe in advance and was later attached to the Minutes of the Congress (IUFRO 1896, pp.63-70).

According to the speaker, most of forest weather stations faced issues related to forest and climate interactions. These were of secondary significance for forestry research because forestry research was focused on issues related to soil temperature, rainwater infiltration, and soil evaporation. On the subject of the influence of forests on the climate, the speaker referred to his own publication. He deemed it necessary to: continue those observations, using such tools as rain gauges and hygrometers; make control measurements twice a day; equip each station with zinc-covered recording devices, including a thermograph, moisture recorder, hygrometer, two wind gauges (for field stations), control thermometer and weather vane, which should be located at a height of 2 meters from the land surface on a Stevenson screen. His co-speaker Dr. Hoppe identified six steps towards improved experimentation arrangements.

Upon delivery of the above reports, the International Union of Forest Experiment Stations deemed it expedient to:

1) Continue the meteorological observations for forestry research purposes and to complement the existing screens with Stevenson screens in order to see differences in measurements between the two devices and assess the impact of the forest on the air temperature and humidity;

2) Equip a group of stations with the best available up-to-date devices as soon as possible to complement the existing stations; and locate the new stations in forests under trees and within glades as well as outside forests at different distances from the forest boundaries, in order to monitor selected meteorological elements such as temperature, humidity, wind and precipitations;

3) Cause only selected forest experiment institutions to undertake such observations as measurements of the evaporation, as well as the amount of effluent water resulting from soil evaporation, soil moisture and all related factors.

To follow up the discussion, Professor Ebermayer presented data on the forest meteorology studies in Bavaria, Prussia and Switzerland. Professor Bühler (Switzerland) noted that in spruce, beech and pine forests, the mean annual temperature varied from 0.2 to 1.0°C. Probably, the comparative trials of the new and old weather stations enabled researchers to identify new

relationships and specify the known ones. In that context, it was advisable to focus on assessments of forest influence on: (i) amounts of effluent water, (ii) surface runoff, especially in mountainous terrains, and (iii) wind strength. Councillor Horn pointed to the need to take into consideration the slope directions and low temperatures in mountains.

In conclusion, Professors Schwappach, Bühler and Ebermayer proposed to launch assessments of the influence of the forest structure on the temperature, wind velocity, soil moisture, water condition and runoffs, given their importance for the scientific basics of silviculture and economic valuation of forests. An overwhelming majority of the participants voted for this proposal and decided to set up a task force consisting of Professors Müttrich, Hoppe, Ebermayer, Schwappach and Bühler for further considerations. All the 16 participants of the meeting signed the Minutes.

After several days of excursions to different sites, on the last day of the Congress (September 24), the second session started at 8:30 a.m. The session specified the decision on the matter, discussed on September 19.

> *Then, the Chairman notified the audience of the statements, made by Director Holmerz from the Stockholm Institute of Forestry and State Councillor Tikhonov*[49] *from Russia about the intentions of Sweden and Russia to join the International Union of Forest Experiment Stations contingent on the consents of their respective governments*[50]*. The audience greeted the statements with applause* (IUFRO 1896, p. 73).

After that, the Chairman asked the participants to pass to the 5th item of the agenda, which was to discuss the proposals of the Committee on Timber Marking. Due to the absence of Senior Forester Schuberg at the meeting, Privy Councillor Professor Kunze delivered his report. He summarized the draft decision of the Committee. Professor Lorey noted that he did not see any substantial changes in the principles of marking. Upon discussion with Professors Lorey and Schwappach and Kunze, it was decided that the Committee would collect and process prepared proposals and proposed amendments within four weeks and present the results in writing.

Further on, the Congress returned to the 1st item of the agenda, which was the report from the Swiss Forest Experiment Station about the surveys of main tree species ranges. Professor Bühler noted that the Commission had discussed the scope and complexity of those surveys for the first time, and that the last of them had been the most comprehensive study, including an overview of both the available literature and earlier completed work. In particular, there were 30 publications about Switzerland, as well as publications/studies by the following: Kerner about Austria, Sendtner about Bavaria, Köppen and Kihlmann about Russia, Flahaulties and Bonnier about France, and Schübler about Norway.

The following methodological approaches were recommended: card indexing by tree species, height, length and width of the range; as well as recording other important indicators such as distribution of tree species on different soils, with different locations and slope directions. The speaker described striking trends in the distribution/ occurrence of selected species, including spruce, larch, fir, mountain pine, Scots pine, mountain maple, alder, chestnut, stone pine, beech, ash, oak, rowan and linden.

Under the 2nd item of the agenda, Professor Schwappach informed the audience about surveys of the main tree species ranges. The surveys were based on an agreed workplan, and according to

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[49] According to some sources (see, e.g., Страхов, Писаренко, Борисов 2001, p. 209), the first Congress, attended by Russia's representative, was the Congress in Switzerland in 1900.

[50] Consent of the Government was a mandatory condition (see the meeting in Badenweiler in 1891) because the Union was created as an intergovernmental association. Accession Applications were submitted to the Chair of the Union (see the Statutes).

the workplan, questionnaires for the studies were sent to the governments of France, Russia, Italy, Sweden, Norway, Denmark, England, Holland, Spain, Romania and Belgium, and also to Hungary through the Austrian Experiment Station.

Denmark, France, Holland and Spain did not provide any responses or information. Italy, England, Romania and Belgium partially completed the work and promised to carry out the observations. Germany also promised to complete the study, but needed to harmonize additional formats and workplans. Professor Bühler assured that Switzerland had commenced the studies in 1894 and would conduct them, relying on support from forest officials and assistance from forest experiment stations. Switzerland completed the study five years later.

Then, the Congress discussed related matters under item 3 of the agenda (tree species ranges and respective data processing methods). Professor Schwappach continued the deliberation, suggesting that Germany should undertake a preliminary compilation and revision of the data. To that end, three groups (for Northern, Central and Southern Germany) were to be established to provide a comprehensive picture for the whole of Germany. The Chairman found it reasonable to postpone the decision until the Forum of the Association of German Forest Experiment Stations. Meanwhile, Professor Bühler and Professor Mayer wanted to continue the discussion at the international level.

Professor Bühler noted that the borders of tree species ranges could be identified only on a mapping basis. The scale of such a map should not be too small, he said. He also advised that tree species range mapping methods should show not only the horizontal projection, but also the vertical distribution. Professor Lorey said that he hoped to have both the highest and the lowest points of surveyed areas depicted under the survey.

Under the 6th item of the agenda (age dating in a growing stock sample), the floor was given to Professor Lorey who articulated the following four key considerations:

1. The age of even-aged tree stands should be estimated only by relying on the tree groups which were left to grow until maturity. The comparative difficulty of establishing the age of young trees should be recognized;
2. It was the so-called age of the growing stock rather than the average age of all trees in the forest;
3. If the difference in the age for two measurements of the same tree stem did not coincide with a given time interval, the age of the later measurement should be considered more reliable;
4. For trees with the so-called ‘narrow’ heartwood, the economic age of the stand, rather than its physical age, should be defined even if all the stems taken for the assessment had narrow heartwoods. It should be taken into account that the difference between the economic and physical age is often 6-10 years, but might reach even 20 years.

Professor Bühler stressed that it was possible to date the age of a tree within 1 to 3 years by counting the annual rings, but the only exception is narrow heartwood trees. It is unnecessary to date the age on the weight basis as it would not differ much from the mean age of the sample (by the value of the admissible error).

Adjunct Böhmerle showed a set of cross-sections (discs) of stems with narrow heartwood and pointed out that the Austrian Experiment Station would use them as a control specimen for repeated age measurements of similar stems.

Professor Schwappach supported Professor Bühler. He pointed out the importance of age dating based on the mean age of the taken samples for the *economic* age, rather than the *physical* age, as well as the divergences in the resultant ages between repeated measurements for the confirmation of the mean values.

Under the 7th item of the agenda, it was Professor Kunze (instead of Senior Forester

Schuberg) who was given the floor to speak about height measurements on mountain slopes. He said that the Vienna Congress (1883) and the meeting in Oldenburg (1894) had revealed the availability of numerous publications about tree height measurements within sample plots and on mountain slopes and about the relationship between the height and stem form (the form factor). No final decision to address the matter was worked out at that time, but scientists identified the need to introduce reduction factors to decrease the bias of height estimation methods.

Adjunct Böhmerle told the audience that in Austria, many tree height estimation studies had been completed and revealed differences ranging from 2-6% to 20%. In addition, there were large deviations in height measurements of trees with significantly swollen butts, which were widely-spread in Austria, Switzerland and southern German States, except for Baden.

Professor Wimmenauer noted that not only the height of a tree, but also its base point, should be ascertained to avoid the impact of various measurements on the form factors.

The discussion resulted in the decision to continue such studies, to specify the height estimation methods and, desirably, the reduction factors in publications of Forest Experiment Stations.

Organizational matters

Under the 8th item of the agenda (the dates and venue for the next meeting), Professor Bühler announced that the President of the Swiss Forest Research Council authorized him to invite the Union to hold the next Congress in Switzerland within the next 4 or 5 years. Professor Bühler's invitation was appreciated and unanimously accepted. According to the Statutes, the Union chairmanship was to go to Switzerland, but a successor to Professor Bühler was not yet appointed. Therefore, it was decided to have the Chairman in Germany until the appointment of his successor.

The meeting was closed at 2:15 p.m.

The 2nd Congress of the Union did not elect the Chair. Later, Switzerland recommended appointing Professor Conrad Bourgeois for that office (1897-1900).

The meeting of the Association of the German Forest Experiment Stations started at 2:30 p.m. on the same day, and it was chaired by Professor Danckelmann. It was attended by Krutina, Mayr, Hesel, Horn, Wimmenauer, Danckelmann, Müttrich, Schwappach, Kunze and Lorey as well as by Professor Bühler as a guest. The Minutes were drawn up by Salle. The meeting discussed a report about the status of club activities and it was decided to hold the next meeting. Professor Lorey proposed to hold the next meeting in 1897 in Tubingen, and all the participants agreed.

Upon adoption of the decision concerning the ranges of main tree species, at the Congress of the International Union of Forest Experiment Stations, Professor Schwappach proposed to classify the forests into three groups: Northern, Middle and Southern Germany, and to use a shared agreed methodology for each group, which would be developed under the leadership of Professors Schwappach, Kunze and Mayr, respectively. The decision-makers agreed to present their results at the next meeting. They also discussed the composition of each group. Professor Mayr suggested that Baden, Württemberg and Alsace-Lorraine should be in one group.

Chairman Danckelmann found the division into the three groups doubtful because the adherence to the shared methodology would prevent the Forest Experiment Stations to apply their own research methods. He therefore advised against the grouping and recommended enabling the Stations to follow their own ways and to report results at the next meeting. Upon voting, the proposals, put forward by Schwappach and Mayr, were rejected.

Councillor Krutina proposed to leave everything unchanged so that each station could conduct its studies, using its own methods, but with due regard to the process of methodological unification. The meeting was closed at 03:00 p.m.

Resolutions

No formal resolutions were adopted.

Excursions

Five excursions were scheduled for September 19-23.

On September 1 (in the afternoon), the 1st excursion brought its participants to the Wolfenbuettel Forest Management Unit, located at a distance of about 20 km from Braunschweig. It included visits to experiment sites in forest stands, originating for both local and foreign seeds, including the hickory (*Carya alba*, *C. sulcata)*, black walnut and bitternut walnut (*Juglans nigra*, *J. cinerea*), and blue poplar (*Liriodendron tulipifera*). Participants saw old pine trees which were planted along the roads in 1760 and, according to a study of the year 1881, had reached 38-40 m in height and 70-80 cm in diameter. There were also trees, originating from self-seeding 30 year ago at a distance of around 70 m from a line pine planting.

The 2nd excursion (on Sunday, September 20) was an all-day trip to the Riddagshaufen Forest Nursery, founded by Hartig. In addition to its parent stock plantation, the participants got acquainted with silvicultural treatments and learnt about their results. Since 1878, that Forest Nursery had been under the Forest Department of the Technical University, which served as the Nursery's experiment base and keeper of its tree species collections. At night, participants of the Congress went to the theatre, according to the program social events.

The 3rd excursion started at 7:45 a.m. on Monday, September 21. From the Central Railway Station, participants went to Koenigslutter. Dr. Rohde accompanied them during the trip through the forest of the Koenigslutter District Administration; they had an hour break for lunch in the forest. In Koenigslutter, they visited recently established experiment sites in forest plantations, dating back to 1857, and plots with introduced plants. After the field trip, the participants had a sightseeing tour, dined downtown and returned back to Braunschweig at 9:00 p.m.

The 4th excursion was on September 22. At 7 a.m. Participants left the Schrader Hotel, and went to the Lehre Forest District Administration, with a snack break on the way. They visited oak and pine stands, cultivated stands, originating from seeds, supplied from abroad, as well as experiment sites after liberation cutting. As for specific species, the excursion was focused on the Douglas fir (*Pseudotsuga douglasii*), pine species (*Pinus jeffreyi, P. ponderosa, P. laricio corsicana*), spruce (*Picea menziesii*), larch (*Larix leptolepis*) and some other species. As they started back at 5 p.m., the participants returned in time to have dinner.

The last, 5th excursion was on the next day, September 23. Participants departed for Seesen at 7:50 a.m. They had breakfast on the way and arrived at the Gittelde Forest District Administration. They walked from 12:00 p.m. until 4:30 p.m., visiting experimental sites on beech stands, which were growing on chalk deposits. Participants became acquainted with the results of intensive thinning when the number of trees was reduced to 250 trees/ha. The group returned to Braunschweig after 9:00 p.m.

Russian participation

We must not forget the crucial participation of V.A. Tikhonov (1849–1913) in that meeting. Vasiliy Andreevich Tikhonov was the son of a priest and, following the steps of his father, graduated from a religious school and a seminary. He taught at a two-year public school in the village of Buturlinovka in the Voronezh Province. Much later, he graduated from the Peter Academy of Agriculture and Forestry and was assigned to the Foresters Corps. He worked as an officer on special errands in the Podolsk Province, taught in the Kherson Agricultural Vocational School where he

gained familiarity with the lifestyle and manners of provincial officials (История дореволюционной России 1979, 1983).

V.A. Tikhonov worked in the Forest Department of Russia, Lisino Training Forest Management Unit and then in the Peter Academy of Agriculture and Forestry. During his trip abroad, he became acquainted with the organization of secondary vocational education in forestry there. Upon returning home, he became a policy-maker and initiator of vocational forest schools (Яковлева 2013) in Russia. His efforts over the course of twenty five years (in 1888-1913) resulted in opening of 43 forest schools in Russia. Most of them were later reorganized into secondary technical vocational schools (colleges), and some of them still exist. The ones which still operate are: the Lisino, Krapivna, Khrenovskoy, Suvodskiy, Mariino-Posad and other forestry colleges (Грекова и Яковлева 2014, p. 22).

In 1896, V.A. Tikhonov took the office of the Vice-Inspector of the Foresters' Corps and on May 14, 1896, he was promoted from the rank of the Collegiate Councillor to the State Councillor. He was a Vice-Director of the Forest Department of the Ministry of Agriculture and State Property.

V.A. Tikhonov had his articles published in the *Lesnoy Zhurnal* (Forest Journal), *Selskoye Khozyaistvo i Lesovodstvo* (Agriculture and Silviculture Journal) and other periodicals (Тихонов 1898a, b). V.A. Tikhonov was a co-author of F.K. Arnold's fundamental book, titled *Russian Forest. Encyclopedia in Three Volumes* («Русский лес. Энциклопедия в трех томах»). Selected parts of this book were prepared by F.K. Arnold in co-authorship with other outstanding foresters such as N.S. Nesterov (1860-1926), L.I. Yashnov (1860-1936), N.A. Filippov (Мелехов 1957).

In the Preface to the 2nd edition of the book, F.K. Arnold directly referred to V.A. Tikhonov as his co-author and supporter, writing as follows: "He [V.A. Tikhonov] was my faithful co-worker in the preparation of the 2nd edition of the book as well as the 1st edition, who had borne almost the entire burden of the work at the new edition due to my poor health; and his name was not listed on the title page next to my own, only because of my friend's great modesty. St. Petersburg, May 26, 1893" (Арнольд 1893, p. iii).

Professor G.F. Morozov dedicated a memorial note about V.A. Tikhonov, published in the *Lesnoy Zhurnal* (Морозов 1913, p. 1-2). It was a very short, but emphatic obituary notice; therefore, we are citing it here in full:

"V.A. Tikhonov.

Vasiliy Andreevich Tikhonov, our well-known forester, deceased on the night of November 22nd, 1913(*).

He was ill for a short time, staying active till the very end. Tikhonov was the founder of primary vocational schools of forestry, initiator of the Forest Conservation Statute, co-author of the *Russian Forest* Book, and author of one of the forest inventory and planning guidelines. He has done a lot for Russian silviculture, and his great and useful contribution will be duly appraised. In this urgently written obituary notice, I cannot even list (to say nothing about reviewing) his works, so I would like only to dwell on some of his features.

First of all, he was an extraordinary person always following his own way.

He started the forest career rather late in life, after many years of teaching in public schools. He was a born and very talented teacher. When, upon abandoning the school, he was admitted to the Peter Academy of Agriculture and graduated from it, he started to teach again, but instead of public schools, he started to teach at a primary vocational school of agriculture. During his business trip abroad, he, again, paid attention to schools and their management frameworks. Upon returning to Russia, he was most of all interested in school development and soon became the initiator of primary forest schools. Those who attended his excursions and lessons in forest schools cannot but pay

tribute to him, even if they do not agree with his principles, and admit that school development was truly his realm.

V.A. Tikhonov left his detailed personal history in the book, titled Twenty five years in civil service. (**) It is very interesting to read it as his life was really highly eventful and meaningful, and in addition, he was a very good writer.

The Editor's Office hopes to dwell upon some aspects of his activities later. The forest community must not pass by this grave without paying tribute to the intense and useful work and contribution of the deceased Forester, leader and writer.

G. Morozov

(*) His portrait was published in the 7th issue of the *Lesnoy Zhurnal* for 1913 in connection with the 25th anniversary of primary forest schools.

(**) Some of the essays were published in the *Lesnoy Zhurnal*" (Морозов 1913, p. 1-2).

Part Two
New Century

Chapter 6
Congress III – September 4-11, 1900, Zurich and Bern, Switzerland

Most of the information for this section was derived from the Minutes of the 3rd Congress of the International Union of Forest Experiment Stations, printed in Zurich by the Printing House of F. Lohbauer (IUFRO 1900).

Overview

The Congress brought together 23 representatives from 7 countries. Like at the previous Congresses, Germany was represented by its Association of Forest Experiment Stations:

- Baden – Councillor Krutina and Chief Forester, Professor Siefert (both from Karlsruhe);
- Bavaria – Professor Mayr (Munich);
- Hessen –Professor Wimmenauer (Giessen);
- Prussia – Chief Forester, Professor Schwappach (Eberswalde);
- Saxony – Councillor, Professor Kunze and Professor Neumeister (both from Tharandt).
- Austria was represented by Chief Forester Friedrich (Mariabrunn), and Switzerland delegated Professor Bourgeois, Professor Engler, Assistants Flury and Pulfer (all from Zurich).

According to the Minutes (IUFRO 1900, p. 4), the countries with non-member experiment stations or with no experiment stations at all were also represented:

- Belgium: Professor Crahay, Water and Forest Resource Inspector from Brussels;
- France: Professor E.Huffel, Water and Forest Resource Inspector from Nancy; and
- Russia: Morozov/Morosoff, Senior Forester from Buturlinowko[51];

The meeting was attended by the following foreign guests: Professor Bühler (Tübingen), Member of the International Commission for Assessing the Forest Influence on the Status of Water; Dr. Cieslar (Mariabrunn); Senior Forester Marchenko (St. Petersburg); Forester Honti Shirasawa (Tokyo); and representatives from Switzerland: Assistant to the Federal Chief Forest Inspector Fankhauser (Bern), as well as Professor Felber and National Council Member Forester Ulrich Meister from Zurich (IUFRO 1900, p. 4).

So, the Congress brought together representatives from seven countries: Austria, Belgium, Germany, Russia, France, Switzerland and Japan. Further, Chairman Friedrich notified the audience that England, Belgium, Denmark, Italy, Hungary, Russia and Japan had join the Union as new members (Ilvessalo 1977, p. 7).

[51] According to the Minutes (IUFRO 1900).

The meeting had two sessions: one in Zurich (two reports and demonstration of a device) and the other in Bern (two reports and discussion of the venue for the next meeting). The excursion program included visits to 7 sites (IUFRO 1900).

Scientific program

The first session was held on September 4, 1900, in Zurich; it was opened by Chief Forester Josef Friedrich.

The session was chaired by Professor Conrad Bourgeois (Zurich) who read out the agenda, consisting of four items. The first covered general matters and amendments to the agenda. The discussion of the agenda gave rise to a debate about its 3rd item, which concerned the participation of the International Union of the Forest Experiment Stations in studies related to technical properties of wood. Professor Schwappach, Chief Forester from Eberswalde, announced that the discussion of that issue was postponed until September 9, when the session in Bern would take place. At the request of the representative from Bavaria, that item of the agenda was changed for a discussion about seed provenance. Finally, the following scientific agenda was adopted:

1. The ranges of main tree species (findings and further discussion). Speaker: Professor Mayr (Munich);
2. Request from the Bavarian Royal Forest Research Institute in Munich for undertaking a seed provenance study. Speaker: Professor Mayr;
3. Demonstration of a newly designed tree growth recorder. Speaker: Chief Forester Friedrich.

Assistants Flury and Pulfer were appointed to provide support for the meeting.

Under the 1st item of the agenda, Professor Mayr showed how the main tree species were investigated in Bavaria. The studies covered 80 plots and their number was recognized to be insufficient. He pointed out that it was necessary to separate research in natural forests from that in forest plantations and that the studies should be confined to dominant forest species (spruce, fir, larch, pine, beech and oak). In addition, Professor Mayr proposed to limit the first stage only to experiments with spruce stands for the time being. Each country might choose one tree species for in-depth studies and add other species as data were accumulated, drawing on the gained experience. A scale of 1:800,000 was deemed quite acceptable for stand mapping. Providing vertical images of the ranges, it was necessary to show mountain ridges, mountains, etc. as well as the bottom and upper margins. Such work for Bavaria had been completed but the data had not yet been processed.

During the discussion, Professor Schwappach informed the audience about similar research efforts in Italy (Vallombrosa), Canada, Denmark and Scotland. He also pointed out that the Union's work had been commended by the Royal Scottish Arboricultural Society[52]. He then referred to the Prussian example to demonstrate the difficulties of mapping the ranges of the beech and fir, noting that elevation mapping of the ranges might be based on the cross-section scale of 1:58,000.

Assistant Cieslar (Mariabrunn) highlighted difficulties that scientists might face in Austria, given its mountainous terrain. Cicelar said that such difficulties might require them to use airplanes, but staff of the Forest Experiment Station should be necessarily involved in the work. The work in the Alps was likely to be difficult, but interesting. In addition, he recommended imposing a temporary limit on the number of studied species, pointing out that for practical reasons, Austria should begin their work with stone, mountain, black, Alpine, and Aleppo pine. He suggested using three horizontal curves to depict the elevation structure: these would show the bottom margin of the

[52] Proceedings of the Royal Scottish Arboricultural Society were published for the first time in 1858. In 1930, the Society was renamed the *Royal Scottish Forest Society*.

species range, the upper margin, and the upper zone of their marginal occurrence. The data should processed with due regard to the specifics of the country, its area and plant geography. Tree species should be examined concurrently. Talking about the complexity of proper mapping, the speaker said that most maps of Central Europe were made at a scale of 1:750,000, and were available at any hotel in Austria.

Answering questions, Professor Mayr joined Assistant Cieslar, proposing to use the vertical curves for several tree species in mountains. However, he insisted that each country should first complete the work for spruce if they wished to arrive at a result. Dr. Neumeister (from Tharandt) supported the proposals of Professor Mayr.

At the suggestion of Professor Schwappach, the decision was made to set up a commission, consisting of Professors Mayr, Bühler and Schwappach, to prepare and present its proposals by the next Congress in Bern. Those proposals were articulated as follows:

- Only natural forest stands should be thoroughly examined to identify their horizontal and vertical ranges;
- Selected species should be studied in the following sequence: spruce, fir, beech, larch, Stone pine (*Pinus cembra*), mountain pine (*Pinus mugo*), and Alpine alder (*Alnus viridis*);
- For each species, the results should be processed on a case by case basis with the use of maps, scaled at 1:750,000;
- Surveys of the above species should be completed by the next meeting of the International Union, with their documents to be stored at the Forest Experiment Stations and their results to be published by each station on its own.

Under the 2nd item of the agenda, Mr. Mayr talked about seed provenances. He referred to studies on the heritability of stand growth properties, which were undertaken by the Imperial Austrian Forest Research Institute in Mariabrunn, and which drew close attention of scientists both in the country and abroad. Those studies addressed a scientifically and practically interesting problem of plant biology and breeding, and their relationships to: the dependence of tree species on extreme weather conditions, and the development of such properties as frost hardiness, at the borders of their ranges compared with the climatic (optimal) range. He said that it was necessary to look from this perspective to assess the adaptability of tree species to the climate outside of their native sites (acclimation) and find out whether such properties could be inherited by the progeny. Another question to be answered was how often tree species inherited favourable or unfavourable traits, such as tree stand stocking, growth rates, shade tolerance, self-pruning, and stem straightness. Another question was how to enhance this function through breeding or protecting from deforming factors (i.e., from snow, insects, and wildlife). In addition, it was necessary to find out whether full inheritance, partial inheritance or its absence occurred only in the first generation or after several generations, if exposed to the same factors. The speaker noted that it was very important to answer those questions.

Other experiments and change monitoring appeared to be rather difficult as they required significant time. The speaker showed that experiments to find answers to those questions, initiated and completed by outstanding practitioners, had been neglected for many years. Forest institutions should address this and decide to provide practitioners with a solid foundation for further action to cultivate local and exotic tree species. Some Experiment Stations had already started such work under selected experiments and at smaller scales.

Having initiated the work, experts embarked on the selection of seeds with required properties in Germany and elsewhere. Thus, upon completion of respective activities, other countries could also benefit from these efforts. In view of this, Dr. Mayr recommended that the Union of Forest Experiment Stations immediately adopt a decision which conveyed the importance of seed

provenance and mutual aid in procuring seeds and undertaking experiments in their respective countries. It was found desirable to confine to two tree species to avoid risks associated with a large work scope.

Therefore, as the Chairman of the Royal Bavarian Research Institute, Professor Mayr suggested that the Union of Forest Experiment Stations should launch field trials at its meeting in Zurich in 1900. The trials were meant to assess the role of seed provenance for the establishment, cultivation and quality of pine and larch stands. A special team was appointed and authorized to work out a general plan of activities to accomplish that endeavour.

Chief Forester Friedrich thanked the participants for the initiative and proposed to include spruce in the list of species for the experiments, alongside pine and larch.

Professor Neumeister supported that proposal, given the importance of spruce for plant communities. He gave an example of behaviours of two sub-species of the European spruce (*Picea abies*) showing high frost-hardiness. In addition, he pointed to the need to focus on assumed frost-hardiness of the cone-shaped Norway spruce. The experiments were to show which of the two sub-species would be more suitable for commercial forest cultivation. He also stressed that the research efforts should rest with forestry institutions rather than individuals, so as to avoid loss of individual scientists' results. Professor Kunze shared his opinion.

Dr. Cieslar noted that with all respect to the results of previous studies, the new ones were only at an early stage, so, it was impossible to predict future behaviour of forest stands at that point. Nevertheless, expected results were very important for the commercial cultivation of forest plantations. He also supported the proposal to include spruce in the further research work.

Professor Engler emphasized that the stem crookedness could be accounted for not only by the intensity of tree growth, but also by heredity, reflecting merely the influence of site specifics in many cases. Speaking about the heredity of the form of pine and larch trees, he noted that unlike Professor Mayr, he was not in the forefront of the research in that field; but he deemed it necessary to attach equal significance to all the mentioned aspects of heredity. Recognizing the importance of spruce for forestry, he advised to include it in the study.

Dr. Mayr gave brief answers to the questions which were asked and underlined his firm commitment to studies related to the growth forms of pine and larch. At the same time, Neumeister, Friedrich, Schwappach, and Cieslar argued for the inclusion of spruce in the experiments.

Senior Forester Morozov from Russia, and Professors Schwappach and Huffel (Nancy) argued also for the inclusion of oak in the experimentation programs. Professor Huffel and Dr. Cieslar confirmed that there were two varieties of *Quercus pedunculata* as evidenced by their observations.

Upon discussion, it was decided to appoint a committee consisting of Professor Neumeister, Professor Mayr and Chief Forester Friedrich, to prepare proposals for the meeting in Bern. The team prepared a draft decision which read that the International Union of Forest Experiment Stations was launching field trials at its Congress in September 1900, with a view to proving the influence of seed provenance on the growth and development of spruce, pine, larch and late flowering oak (*Quercus pedunculata* var. *tardissima* Simonkai). The proposal also described the factors to be taken into account for purposes of seed harvesting and research, pertaining to all the four tree species. Such factors for spruce, for instance, included the altitudinal and latitudinal gradients, tree age, distance from the coast, and differences in the elevation with the same slope direction.

As for pine, the proposal recommended focusing on the following sites: (i) in the vicinity of the 'cold' border of the natural range of the Scots pine, including areas in Northern Sweden, Northern Norway and Northern Finland; (ii) in the inner parts of the range, such as in the North German Plain and Baltic Provinces (Riga); (iii) in the warmest areas of Central Europe, such as in the valleys of the Rhine and Main Rivers.

Larch seed would be collected for the establishment of provenance study plantations: (i) at different elevations in the Alps; (ii) in Sudetenland; and 3) in North-Eastern Russia, in Siberia (*Larix sibirica*), preferably from flat terrain and steep slopes.

As for oak, the intention was to harvest seeds from different areas and to include frost-hardiness comparisons of the ordinary oak (the English oak – *Quercus robur* L., *Q. pedunculata* Ehrh.) with the late-flowering oak (*Q. pedunculata* var. *tardissima* Simonkai) in the study.

The 3rd item of the agenda involved demonstration of the automatic recorder of tree growth, newly designed by Chief Forester Friedrich. After the explanation of the technical aspects and mechanical principle of its operation, the designer noted that the main idea was to measure the tree diameter at different heights and over time.

During the discussion, Professor Mayr said that it would be interesting to obtain data not only for living trees, but also for standing dead trees as well as for growing trees in wintertime. Professor Neumeister noted that instrumental readings could be affected by temperature fluctuations.

The first session was closed at 12:30.

The second session of the Congress was opened in Bern on September 9, 1900. It was chaired by Professor Conrad Bourgeois who welcomed the Delegates and numerous guests. Participants endorsed of the Zurich Session Minutes of September 4, 1900. The Bern session agenda consisted of the following four items:

1. Participation of the International Union of Forest Experiment Stations in studies on technical properties of wood. Speaker: Professor Schwappach;
2. Report and program of research work to assess the influence of forests on the status of waters. Speaker: Professor Bühler;
3. Dates and venue of the 4th Congress of the International Union of Forest Experiment Stations;
4. Miscellaneous.

Under the 1st item of the agenda, Professor Schwappach lengthy proposals of Professor Rudeloff (Charlottenburg), supported with offered frameworks, a work program and indicative testing procedure, and expressed his opinion about the need to conclude agreements for introducing inform procedures for studying technical properties of wood. First of all, such an agreement was necessary to ensure compatibility of results from different experimental devices because deviations from agreed and adopted frameworks might be acceptable only when it was required for a special site of a study. In particular, the following testing framework was offered (IUFRO 1900, pp. 18-27):

I. Information about the origin of the wood (sample);
II. External characteristics of the wood (sample);
III. The examination procedure:
  A. Strength properties: a pressure test; bend test; shear test; pull test; cleavage test;
  B. Moisture levels;
  C. Density;
  D. Shrinkage and swelling;
IV. Sampling at different stem heights;
V. Proposals on alternative trials.

The proposal was discussed by Friedrich, Johnson, Roth, Rudeloff, Schwappach and von Tubeuf. In particular, Tubeuf and Johnson acted, practically, as co-speakers and their observations were prominently featured in the Minutes (pp. 28-35). Finally, according to the adopted decision, the International Union deemed it important to investigate technical properties of wood and invited its members and representatives from non-member countries to join the efforts and follow-up work.

After its refinement with due regard to provided comments, the testing framework was adopted. It was noted that the testing would make it possible for wood to occupy its proper place among major construction materials such as iron, steel, brick, cement, and concrete.

Under the 2nd item of the agenda, Professor Bühler informed the audience that Professor Ernst Ebermayer had been elected Chairman of the Commission, which had been established in Braunschweig in 1896 to start analysing issues of forest and moisture interrelations. Its first meeting was convened on April 13-15, 1899. It was postponed until then to enable its members to have sufficient time to look into the matter, undertake preliminary investigations and obtain some results.

The developed program was adopted as a basis. As noted, the general report, prepared by the Commission, had been published in most forestry journals. Each member of the Commission was responsible for his own area of work and thorough editing. In addition, speakers of the Congress used information from the publication, prepared by Ebermayer, Hoppe and Müttrich.

Preparatory studies showed that there was a lot of work ahead. First of all, it was necessary to examine the water processes in the forest and in open spaces. Switzerland had already embarked on such studies. Obtained results revealed that the evaporation levels were lower in forests and in areas covered with vegetation by 89% and 30%, respectively, than on bare ground. In addition, it was necessary to compare the water flows in mountainous versus lowland rivers, to assess soil erosion, and threats of a geological nature (such as avalanches). After an integrated analysis of all these factors, a concrete methodology could be developed for that work. In view of the scope and complexity of the efforts, the Commission requested that the influence of forests on the water status be included in the agenda of the next Congress of the International Union – and it was.

During the discussion, Professors Neumeister, Bühler, Mayr, Huffel, Morlott from Bern, as well as Schwappach and others indicated that the water quantity and balance could be substantially affected by factors such as evaporation and condensation in the upper layers of the soil, ice accumulation in tree crowns, and temperature fluctuations.

G.F. Morozov presented interesting information about his ground water measurements, using water collecting headers (tanks) in the context of extensive steppe afforestation. He told the audience about his intentions to scale up the experiments and organize them in such a way which would enable scientists to compare the ground water levels in forests and in steppes and make conclusions about the influence of the forest. He also noted that forest shelterbelts changed the snow accumulation rates and that similar studies could be undertaken in the Rhone River basin.

Professor Bühler proposed and the Congress agreed to endorse the draft research program, presented by the team. It was recommended that the work continue, taking into account the proposals concerning the moisture accumulators, forest shelterbelts, and integration of various factors.

Under the 3rd item of the agenda, the floor was given to Professor Conrad Bourgeois who reminded the audience about the history of the Union and its meetings; he also proposed that Spain host the next meeting of the Union. At the same time, he expressed a concern about the situation in the country which could prevent it from hosting the Congress. Chief Forester J. Friedrich suggested that Vienna could host it instead, and the decision was made to hold the next Congress in Vienna. In such a case, in accordance with the established rules, the Union chairmanship would go from Switzerland to Austria, and Mr. Friedrich would assume the role of the Chairman and host the Congress in 1903 or 1904, depending on its preparation progress.

As part of the discussion, Assistant Flury suggested that a standardized integrated nomenclature of forestry publications should introduced. Professor Schwappach said that he personally liked that proposal, but was against adopting any decision about it before it was discussed within the Association of German Forest Experiment Stations.

Professor Crahay informed the audience about his successful experience with fertilizers in

Belgium, and showed photographs too! Due to the depletion of the soils where forests were to be planted, the application of artificial fertilizers was deemed necessary and financially/economically viable. Specifically, he referred to a case of lupine sowing as well as to the successful application of phosphates and lime to accelerate organic matter decomposition in forest plantations, aged 10-20, on stony soils. He suggested that the Union should take note of that issue.

In his closing remarks, Chairman Josef Friedrich invited all the participants to take part in the next meeting in Vienna. He also thanked Chairman Conrad Bourgeois, the participants and the numerous guests for their cooperation and closed both the session and the Congress at 01:00 p.m.

Organizational matters

Josef Friedrich (1901-1903) was again elected Chairman of the Union.

Resolutions

The Congress did not adopt any formal resolution. Nevertheless, decisions were adopted on many items of the agenda and played a definitive role in the further development of forest science and practice.

Excursions

The program consisted of 7 excursions.

Russian participation

According to the Congress Minutes, two foresters represented Russia at the Congress: they were G.F. Morozov from Buturlinovka and A.G. Marchenko from St. Petersburg.

According to the documents of the Congress, Forester G.F. Morozov from Russia, Professor A.F. Schwappach from Germany (Eberswalde) and Professor E. Huffel from France (Nancy) put forward their recommendation to include oak in the research program [53] (IUFRO 1900, p. 11).

During the discussion of role of the water status, Professor Mayr noted that temperature fluctuations led to moisture condensation in upper layers of the soil. Professor Huffel had observed a similar phenomenon in tree crowns retaining big amounts of water. G.F. Morozov shared his experience of forest cultivation in arid steppe, which had been gained in the process of extensive afforestation efforts in Russia. He had measured the groundwater levels and compared them with the degree of afforestation within the experimental areas. In addition, he showed the role of forest shelterbelts in snow accumulation and assumed that it would be possible to assess the influence of the forest cover of an area on snow accumulation in the Rhone watershed (IUFRO 1900, p. 43). That presentation, based on only five years of study (1896-1900) in Russia and Prussia, was but a minor reflection of many years of G.F. Morozov's work and his experience in the field, (Морозов 1896, 1899a-c, 1900a-g).

It should be said that the attribution of G.F. Morozov to Buturlinovka, recorded in the Minutes, was only partially true. He had indeed worked there as an Assistant Forester and taught in the forest school in 1894-1896, but since May 1, 1896, he had been on a two-year study tour abroad – in Germany (Bavaria, Hesse, Thuringia, Prussia, Saxony), Switzerland and Austria. He had visited over 70 forest management units there (Калюжный 2004).

Upon returning home in 1898, G.F. Morozov led an operation to cultivate forests on sandy

[53] G.F. Morozov's ideas were further developed by his assistants - A.G. Marchenko and A.A. Khitrovo, who produced interesting studies related to the biology of oak forests (Мелехов 1957, p. 104).

soils (350 ha) in the Pavlovsk District of the Voronezh Province, and in the autumn of the same year, he was appointed Senior Timber Cruiser to manage the Khrenovskoy Experimental Area of the Special Expedition of the Forest Department, led by V.V. Dokuchaev. In May 1899, he became the Forester of the newly established Kamennaya Steppe Experimental Forest Management Unit in the Voronezh Province where he established forest shelterbelts which covered a total of 44 ha and 32 experimental areas. In August 1900, he represented Russia at the International Congress on Forest Experimentation in Zurich. When he returned from Switzerland, he was invited to have two talks with students of the 4th year (Калюжный 2004, p. 199). In November 1901, G.F. Morozov was elected professor at the St. Petersburg Forest Institute, where he headed the Chair of General Silviculture till 1917.

Our readers might be less familiar with the life and work of A.G. Marchenko (1872-1940), who graduated from the Kharkov Agricultural School and the St. Petersburg Forest Institute (in 1896). He continued to work there as a fellow at the Chair, headed by Professor V.Ya. Dobrovlyanskiy (1864-1910). In the summer of 1898, he visited several experiment stations in Russia, and in 1900, he had a study tour abroad: in Germany, he studied forestry and forest experimentation, and in France, he grew acquainted with its thinning practices (Редько и Редько 2003). In the Forest Institute, A.G. Marchenko worked with G.F. Morozov (1867-1920), A.A. Kryudener (1869-1951), K.K. Gedroitz (1872-1932), A.P. Tolskiy (1874-1942) and others. It was no wonder that he attended the Congress of the International Union of Forest Experiment Stations in 1900, as he was abroad at that time.

After the study tour, A.G. Marchenko worked in the Tula Zaseki Area. In 1903, he became an assistant at the Chair of Silviculture, headed by G.F. Morozov. In 1905, he was elected professor of forest inventory, mensuration and planning in the Novo-Alexandria Institute of Agriculture and Silviculture. He was the Director of a forest experiment station and the Manager of the *Ruda* Forest Allotment from 1905 to 1914. He made an important contribution in the development of forest science, education and practical forestry in the Ukraine (Редько и Редько 2003).

Interesting facts

The 1900 Congress laid the foundation for experiments and observations in provenance study plantations (IUFRO 1900).. The studies covered such tree species as spruce (*Picea*) in four reiterations, Scots pine (*Pinus sylvestris*) in multiple varieties with planting of 200 plants, three sub-species of larch (*Larix*), and oak (*Quercus pedunculata* var. *tardissima* Simonkai).

The first experiments with provenance study plantation establishment are associated with such names as Henry de Vilmorin (1823-1832) in France, M.K. Turskiy (1877-1878) in Russia, M. Kinitz (1877-1878) in Germany and A. Zislar (1893-1896) in Austria. Thus, the decision to establish an international network of provenance study plantations was planted (so to speak) in already prepared soil and Russia played a major role in that large-scaled effort. The involvement of Russia enabled the inclusion of the Siberian larch (*Larix sibirica*) in the list of tree species to be assessed from the angle of geographical variability. Also included was the European larch, which grew in the High Alps and in Sudetenland, Germany.

It was the first IUFRO meeting to be hosted by two cities. It was also the first time that the French language was used in the Congress documents: the Congress Minutes had an attachment in French, which was prepared by Professor Crahay from Brussels, Belgium, and contained information about experiences with seed storage, nursery operation, right-of-way clearing and timber imports and exports in 1898 (IUFRO 1900, p. 16). It was also the first time that the English language was used by an author: Johnson, in his *Rules for determining the strength of timber to carry continuous loads* (IUFRO 1900, pp. 31-35).

* * *

In conclusion, it should be noted that for a long time there was no consensus about the year of IUFRO's foundation, as different criteria were used at different times. To illustrate: some argued that its foundation year was the year when the proposal to establish the International Union of Forest Experiment Stations was announced at the International Congress in Vienna in 1890 (Friedrich 1894). This view was repeated at some IUFRO Congresses. To take one example, IUFRO President Professor Lönnroth said at the Congress in Switzerland (1948)[54] that the year 1890 was considered the actual year of its foundation, because this was the year when the first meeting of forestry scientists had been held for this purpose in Badenweiler (IUFRO 1948, pp. 22-24). These words were repeated practically verbatim in London: "There have been immense changes in the world since 1890 when it was founded, but despite them all, the Union has gone steadily on from strength to strength, playing an increasingly important role in helping to widen the world's knowledge of forestry" (IUFRO 1956a, p.11). Similarly, at the Congress in Vienna, it was stated that the Congresses were "founded in Vienna (Bohmerle) in 1890, and constituted in Eberswalde in 1892" (IUFRO 1961, p. 95).

However, others were convinced that the time of its establishment is directly linked with the first meeting of foresters in Badenweiler on September 18, 1891 to draft the Statutes. The Protocol was signed (IUFRO 1892) at this meeting, and was published by Boppe and Huffel (France), Bühler (Switzerland), Danckelmann and Schuberg (Germany), and our first President Friedrich (Austria). Friedrich said: "If the International Council were to consider 1891 to be the year of IUFRO's foundation, our Union will celebrate its centenary during the 19th IUFRO Congress in 1991" (Bein 1976, pp. 350-351). During the IUFRO Congress in 1976 in Norway, the year 1891 was once again noted as the year of IUFRO's birth. Among other things, it was reflected in the title of the exhibition: *85 years of IUFRO*, in which lots of various historical materials were displayed (IUFRO 1976a).

Still others believe that the foundation of IUFRO should be dated at the year 1892. This, we must remember, the year of the meeting at which approved the organization's Statutes, consistent with the meaning of the Latin verb *constituere* (Richter & Schwartz 1967, p. 558). This interpretation was confirmed by the 1992 Conference, held to celebrate the Centenary of Union (IUFRO 1992).

Some continue to hold the opinion that 1893 is the real year of IUFRO's founding, as this was the year of its truly first Congress: "The Union was formally established in Eberswalde and held its first Congress in 1893 in Vienna" (IUFRO 1936a, p. 2). This view was also reflected in the title of a report, published at the end of the first Congress: *Report of the First Meeting of the International Association of Forest Experiment Stations in Mariabrunn 1893* (Friedrich 1894). However, at the end of the meeting the First Chairman J. Friedrich stated that before the formal establishment and adoption of the Statutes of the International Association could take place, there were some difficulties to grapple with (Friedrich 1893, p. 384).

Amidst the controversy around the year of IUFRO's foundation and the year of the first Congress, it is worth noting that in the late 19th century, a remarkable event took place in the history of forest science which led to the emergence of the global resource centre for the forest research

[54] Als das eigentliche Jahr seiner Gründung wird 1890 angesehen, wo in Badenweiler die erste Versammlung von Forstwissenschaftlern zu diesem Zwecke abgehalten wurde. Da jedoch dieser Versammlung eine forstwitsenschaftliche Exkursion in der Schweiz voranging, kann man die Schweiz gewissermaßen als das Heimatland dieses internationalen Verbandes betrachten. == As the year 1890 is deemed to be the actual year of its foundation because the first meeting of forestry scientists was held for this purpose in Badenweiler in 1890. However, since that meeting was preceded by a forestry excursion in Switzerland you can look at Switzerland as a sort of the home country of this international association.

community. The forest experimentation institutions of Central European countries established a union to coordinate and harmonize their methods of silvicultural research on permanent experiment sites and to discuss findings of such research. The Union which soon became a highly authoritative international organization – IUFRO (Шутов 2012, p. 281).

The Congresses have enabled forest scientists to inform their colleagues about exiting problems, share ongoing work and results, increase their visibility for a wider audience of scientists and foresters, and evaluate and interlink related research areas. It would worthwhile to refer to the report of Professor Lorey on the principles of tree diameter measurement: it was found out that the diameter was best measured at a height of 1.3 m. So, although the IUFRO proposal on measuring the tree diameter at breast height (d.b.h.) was simply a recommendation, it is still applied in most of countries (Schmutzenhofer 1996a).

An important outcome of that period was the increased visibility of Russia's involvement in the International Union of Forest Experiment Stations. Two years after the Congress, in 1898 Russia celebrated the centenary of its Forest Department (1898).

V.A. Tikhonov, Vice-Director of the Forest Department of Russia, submitted Russia's Accession Application to the International Union of Forest Experiment Stations in 1896. However, the country joined the Union only later - between 1900 and 1903. According to Professor Morozov, as of 1892 all German States, Austria and Switzerland were members of the International Union of Forest Experiment Stations; but Russia and France were not members at that time, though their representatives attended the two latest Congresses[55] (Морозов 1901, p. 327). Meanwhile, Professor Ilvessalo pointed out the words of Chairman J. Friedrich at the 1900 meeting that a few new members including Russia has joined the Union (Ilvessalo 1977, p.7).

Now, it is difficult to say why Russia did not join IUFRO before the 20th century. Perhaps there were many subjective and objective causes, including the lack of a clear rationale for forest experimental stations in Russia since Russian foresters were at that time able to carry out forest research in specially designed forest management units among Russian foresters; long discussion among the forest authorities and civil society to assess the need to have forest experiment stations in Russia and define their scientific and organizational aspects; doubts about the potential of such stations to improve performance, compared with the currently applied best practices of forest research in experimental or training forest management units; and slow establishment of such experiment stations in Russia. Nevertheless, it is worthwhile to highlight the fact that the Russian Empire submitted an application, and that Congress expressed a sincere desire to see Russia among the members of the international union of foresters.

In the late 19th to early 20th century, global trends in science revolved around ideas, and a desire to pool scattered resources and knowledge for the benefit of common prosperity and progress.

Such efforts enabled the institution of numerous international associations of natural scientists, physicians, chemists, geologists, technicians, technologists and many other specialists. Varied though they were, all of them had one feature in common: they convened regular conferences to discuss the latest achievements and developments in their field. Such meetings offered opportunities to expedite the articulation and sharing of existing points of view on the issues under discussion, instead of relying on the cumbersome disputes through publications.

The overarching goal of the International Union of Forest Experiment Stations was not simply to have theoretical discussions; it was also to develop an acquaintance with practical forestry in the country hosting each of the conferences, as well as become familiar with that country's

[55] He meant the Congresses of 1896 and 1900. In 1903, Russia was already a member of the Union (IUFRO 1903a).

laboratory base, tools, equipment, forest experiment sites, tree nurseries, and arboreta. Field trips were considered a major instrument for studying the forest sector of unfamiliar countries.

The first Congresses laid a foundation for all future work of the Union. The initially identified and addressed objectives were centred around the need to unify forest research to ensure compatibility of research methodologies and measurements in different countries, as well as the need to specify and improve those and other methodologies. Forest scientists and practitioners met periodically in international assemblies, workshops, conferences, symposia and congresses; these settings were conductive to meeting the Union's objectives.

Time has proved the effectiveness of such an approach. Later, the Union enabled in-depth discussions among forest researchers about complicated issues. Scientists started to unite their efforts through establishing thematic groups of those who were keen to undertake joined studies.

[Mariabrunn in the 1890s. Source: Friedrich 1894, p.131.]

Chapter 7
Congress IV – August 31 –September 5, 1903, Vienna, Austria

The bulk of the information for this Chapter was drawn from the Report of the 4th Congress of the International Union of Forest Experiment Stations, published by the Federal Forest Research Centre at Mariabrunn (IUFRO 1903a).

Overview

The meeting brought together 35 delegates from 10 countries, with all the German Lands taken for one country. The Congress was attended by representatives from the three founder-countries of the Union, as well as from Belgium, Denmark, England, Hungary, Japan, Norway, and Russia (IUFRO 1903a). According to Professor Alfred Siefert, as of that time, the Union consisted of all the Experiment Stations of the German Empire (nine in all), as well as Stations in Austria, Belgium, Denmark, England, Italy, Japan, Russia, Spain, and Switzerland (Siefert 1904, pp. 26-27). Among the member-countries, Spain and Italy were not represented at the Congress, and Norway was there as a guest.

Visits to experiment sites were scheduled for August 30 – September 1, 1903. The sites belonged to noble families; one of the areas was owned by Prince Karl Schwarzenberg and was located near his Worlik Castle in Bohemia (IUFRO 1903b). Unfortunately, hail severely damaged many of the experiment sites and made them unsuitable for the planned visits. Though the program was reduced for that reason, the Delegates nevertheless met on August 30, 1903, in the Grand Hotel in Vienna where they dined.

On August 31, 1903, they went to Mariabrunn by train. There, delegates commented on the decor of the host building. The lobby and staircase were styled as a green grove of local and exotic tree species, and the walls were decorated with antlers. The hosts had prepared a ballroom, forest museum and conference hall where a portrait of Emperor Franz Josef hung behind the dais.

According to the Minutes of the Congress (IUFRO 1903a), the Congress was attended by representatives from 8 countries (or 13 countries, taking each German station for a representative of the country). They were: Professor A. Bühler, Tübingen University; Forest Inspector N.I. Crahay, Brussels, Belgium, Guard General I. Pullet, Saint-Hubert, Belgium; Dr. A. Dengler, Prussian Royal Forest Assessor, Professor A. Müttrich, Privy Councillor and Professor A. Schwappach, Royal Forester, Eberswalde; Professor A. Engler, Director, Federal Central Research Institute, Zurich; Professor L. Fekete, Chief Forester and Professor J. Vadaš, Director, Forest Research Institute, Schemnitz; Ph. Flury, Adjunct, Swiss Forest Research Institute, Zurich; Professor M. Kunze, Privy Councillor and Dr. M. Neumeister, Chief Forester, Tharandt; Professor H. Matthes, Forester, Eisenach; Professor H. Mayr and Professor E. Ramann, Munich University; Professor G. Morosoff/G. Morozov, Imperial St. Petersburg Forest Institute, Russia; Dr. R.E. Muller, Chief Forester and Professor A. Oppermann, Director, Danish Forest Research Institute, Copenhagen; Professor Siefert, Chief Forester, Karlsruhe; J. Söltz, Royal Chief Forester, Budapest; Dr. V. Sommerville, Assistant Secretary, Agricultural Council, London. The Imperial Forest Research Institute at Mariabrunn was represented by: Adjunct K. Böhmerle; Dr. A. Cieslar; Adjunct J.

Friedrich, Emperor's Councillor, Director, Imperial Forest Research Institute; G. Janka, Manager of the Emperor's and Royalties' Estate; Forester A. Schiffel; and Dr. W. Sedlaczek, Assistant Forester.

The meeting was also attended by the following guests: Royal Forester A. Wiltsch, Dr. E. Hoppe, from the Ministry of Agriculture, Adjunct, Royal Station of Agricultural Chemistry and Dr. N. Lorenz (all from Vienna); Adjunct Ritter von Liburnau, Vienna; K. Arendt, Royal Prussian Forest Assessor, Berlin; O. Hartmann, Munich, as well as Dr. H. Ichijima from the Imperial Japanese Ministry of Forestry, Formosa[56] and Professor A.K. Myrvold, Os, Christiania[57], Norway.

Scientific program

The Congress included two sessions, 8 reports and 4 excursions, half a day each.

The first session was opened on August 31, 1903 at 9:00 a.m. in the Forest Centre at Mariabrunn. Its agenda was as follows:

1. Reporting about the Union's work between the two meetings (after the meeting of 1900);
2. Towards amending the Statutes of the International Union of Forest Experiment Stations. Speaker: J. Friedrich (Mariabrunn);
3. About the Guidelines on Forest Thinning. Speakers: Schwappach (Eberswalde), Engler (Zurich) and Böhmerle (Mariabrunn);
4. Development of a universal forest bibliography. Speakers: Flury (Zurich) and Böhmerle (Mariabrunn);
5. Report of the Water and Forest Committee. Speakers: Ebermayer (Munich), Müttrich (Eberswalde), Bühler (Tübingen) and Hoppe (Vienna).

The session was opened by Privy Councillor Friedrich, Chairman of the International Union of Forest Experiment Stations. Unfortunately, he was hoarse and unable to chair the meeting. At his request, the Congress endorsed his replacement in that capacity, and Forester Schiffel was designated to act as chairman of the meeting.

The Chairman announced that His Excellency Karl von Giovanelli, Minister of Agriculture, could not attend the session although he had intended to welcome the meeting of the Union personally. Instead, the welcome address from the Ministry was made by A. Wiltsch. He noted that Austria was particularly glad to host the meeting at Mariabrunn for the second time since the institution of the Union. It testified to the fact that experiment sites and the work of the Institute were of interest to research institutions of other countries. He extended best wishes of successful work to the Congress.

As proposed by the Chairman, H. Janka from Mariabrunn and K. Arend from Berlin were elected to act as secretaries.

The Congress participants honoured the memory of Dr. B. Danckelmann from Eberswalde, Professor C. Bourgeois from Zurich and Professor T. Lorey from Tübingen who had died during the period since the last meeting of the year 1900.

Under item 1 of the agenda, the Chair informed the audience that the Union had acquired new member-organizations, as it had been joined by forest research institutions from Belgium, England, Denmark, Hungary, Italy, Japan, and Russia.

Under item 2 of the agenda, the floor was given to J. Friedrich who informed the audience that the Union's Statutes and Internal Regulation[58] had been drafted. These draft documents were discussed. During the discussion, the floor was given to Engler, Schwappach, Friedrich, Mayr,

[56] Now: the Island of Taiwan.
[57] Now: Oslo.
[58] In the original: *Geschäftsordnung*.

Neumeister, Bühler, Kunze, Schiffel, von Söltz and Cieslar. After the discussion, appropriate decisions were adopted.

The most significant revisions were made in paragraph §3 of the Statutes, and these revisions resulted in a membership rule that members of the Union should be public-sector research institutions rather than countries. In addition to full-fledged members, guests (invited participants) were eligible to participate in scientific discussions but did not have voting rights. In making administrative decisions, each member of the Union had one vote.

Under item 3 of the agenda, the first speaker was Adjunct K. Böhmerle whose speech was complemented by A. Schwappach and A. Engler.

The speaker noted that the research he presented was based on the premises discussed at the meeting of the Association of German Forest Experiment Stations in 1902 in Dresden. He underlined the need to customize the old plan of action to ensure ideal growing stock in accordance with the real demands, through identifying the causes of the currently poor growth and those tree species which failed to demonstrate economic feasibility of thinning. Moreover, as the thinning intensity classes (low, moderate and high intensity of thinning) had not been fully agreed upon, it was rarely possible to make comparisons, especially over time. It was also difficult to set targets based on thinning intensity, which remained abstract and did not permit scientists to make final conclusions under experiments with multiple gradations. The inclusion of high-intensity thinning (*Hochdurchforstung*) in plans of operations was supported because it opened new prospects for thinning practices. Nevertheless, the Austrian Research Institute could not yet articulate any definite opinion about this series of experiments, and as the study was still underway they had to wait to examine the experiment sites. The new schedule of work would allow for a resolution of recently emerged problems, including those related to equipment for experiments, and availability of resources. Other recent challenges included the need to improve the quality and accuracy of inventory records, including those on the reporting period revenues, growing stock and other indicators. With respect to the sizes of selected experiment sites, it was pointed out that in young stands, (e.g., with high-intensity thinning), the site area should be larger than in stands with other thinning intensities, but smaller than in experiments with older stands. The speaker concluded that there was no doubt about the appropriateness and economic benefits of reform.

Professor Schwappach from Eberswalde started his report with a historical introduction. He noted that soon after founding the Union in 1873, German forest research institutions had agreed upon and adopted a plan of research activities to assess the growth responses to silvicultural treatments. Such a plan had been adopted by research institutions in Austria and Switzerland, and until 1902 (in other words, for nearly 30 years), it had remained consistent with its main principles. Proposals for activities to study the economic dimensions of thinning effects might be developed only on the basis of respective previous ideas and knowledge of silviculture. As this plan was subject to change, the speaker deemed it necessary to revise it from time to time, allowing for full restructuring if necessary. A comparison of the plans of German and Austrian Forest Experiment Stations, adopted in 1873 and 1902, demonstrates that no of the areas of silviculture had recently seen such drastic changes as had the efforts to assess the growth responses to thinning (IUFRO 1903a, p. 10). Without underestimating the old plan, the Association of German Forest Experiment Stations and other stakeholders recognized the need to revise it long ago. To be specific: at a meeting in Tharandt, in 1889, Professor Lorey had proposed to have a broad discussion of the plan of work to assess effects of thinning. In 1891, it had been proposed to introduce in the workplan the fourth

class of thinning intensity (*Eclaircie par le haut*)[59] – thinning from above (crown thinning, high thinning). In Württemberg, in the mid-1880s, the idea to introduce another degree of thinning intensity (D-grade) had been conveyed to the Swiss and Austrian Research Institutes to be mainstreamed into their plans of experimentation.

In 1900 in Bern, the Union decided to include the issue of the thinning research plan into the agenda for the next Congress. In 1901, the Tübingen meeting of the Association of German Forest Experiment Stations had addressed some key issues, including those related to tree stem development (*Stamm-klassenbildung*) and thinning classes (*Durchforstungsgrade*), and was ready to include them in the new plan. Adjunct K. Böhmerle from the Austrian Forest Research Institute was present at the Tübingen meeting of the Association of German Forest Experiment Stations and proposed to initiate and prepare an international agreement on that issue – with involvement of representatives from the Austrian and Swiss Institutes. This international team met during the Easter period in 1902, and in the same year, the draft had been included in the agenda of the Dresden meeting of the German Association.

Further on, the participants discussed the possibility of using Guidelines on Forest Thinning as a basis for deliberations at the Congress of the International Union of Forest Experiment Stations. Their plan was divided into three parts: the first contained experimentation frameworks, and the other two described the technical aspects of experiments. The discussion was focused on responses to thinning in terms of tree stem development and thinning classification into 4 classes (A-D). The speaker proposed to adopt the German-Austrian Plan of Research Work.

The third speaker, Professor A. Engler from Zurich gave detailed answers to the following three questions: (1) What are the first-priority problems to be addressed through thinning experiments? (2) What principles are to be observed in the course of experimentation? (3) To what extent is it possible and desirable to have certain thinning-related decisions made by the International Union of Forest Experiment Stations? He said that thinning was a very complicated economic activity because the selection of its technique (e.g., to arrive at a growing stock target) was associated with spending significant amounts of money. At the same time, it was necessary to maximize the use of natural production capacity of the soil which, in turn, depended on multiple factors.

He also noted the importance of education, specifically education regarding the appropriate application of obtained knowledge. He said that it was only natural that one and the same level of growth stock could be reached with the use of different techniques and trade-offs, given the fact that even only two foresters might have different views at causes and effects. For that reason, thinning experiments was a common issue that should be properly addressed at the local level through undertaking one series of trials. These trials might focus on a result such as more valuable final tree growths, and, hence, timber of a higher value. This was particularly true for mixed stands. Revenue statistics showed that thinning might actually be of great practical significance, e.g., for taxation purposes. In countries where there were no homogenous forest sites, forest management, transportation or market conditions, such efforts were only of limited value.

Then, the speaker described the five classes of tree samples in stands, adopted in Switzerland and the type of thinning experienced there. He also suggested establishing an agreed-upon framework for experiment description to compare results of different studies in different member-countries.

[59] Im Jahre 1891 erfolgte die Einführung der Eclaircie par le haut als eines vierten Durchforstungsgrades in den Arbeitsplan (IUFRO 1903b, p.427).

Specifically, the following common principles were identified to be adopted by the International Union of Forest Experiment Stations (IUFRO 1903a, p.19-20):

1. Describe the experiment site[60] with demarcated borders where precise measurements are made. Avoid subsequent changes in the location and shape of the site;

2. Number the logbooks, mark the diameter measurement points at breast height on trees (1.3 m above the ground) with respective coloured symbols to have two perpendicular diameter measurement marks in the same places. On slopes, make measurements at a height of 1.3 m from the slope side. Describe other details of the measurement procedure in publications;

3. In order to provide a precise description of thinning experiment progress, indicate the number, diameter and height of the tree on the blazed sides of the trees left to grow. To understand the nature of stand development easily and quickly, use 5 classes of tree conditions[61] and use numbers to denominate the classes;

4. When establishing an experiment site and areas for reiterated surveys, provide descriptions of chemical and physical properties of the soil, its dead and living cover;

5. Provide a detailed theoretical framework and remarks for publications.

To initiate the discussion, the floor was given to Schwappach, who had objections pertaining to some provisions of Engler's report; to Professor Bühler, who agreed with the speaker's comments, especially with respect to the new thinning workplan; and to Oppermann from Copenhagen who talked about the possibility of doing such work in Denmark, and expressed his wish that Denmark could have participated in the voting on the workplan.

When the debates ended, Böhmerle proposed to create a committee comprised of those who participated in the discussion. This proposed committee would work until the next meeting to align the positions of the two sides. The proposal was not accepted. After the closing remarks, made by Schwappach, Mayr, Neumeister, Bühler and Friedrich, Professor Schwappach proposed to record in the Minutes that the International Union of Forest Experiment Stations recommended its members using the Guidelines on Forest Thinning, presented by the Association of German Forest Experiment Stations as a framework for experimentation (IUFRO 1903a, p. 22).

That resolution was not adopted by roll call vote: Out of the 17 voters, 6 were against and 7 abstained from voting. Therefore, Engler's proposal was not accepted. Per request from Mayr, the names of those who voted against were recorded in the Minutes (Bühler, Engler, Flury, Matthes, Mayr and Ramann).

As it was already late in the day, the participants decided to postpone item 4 of the agenda **(**Development of a universal forest bibliography) until the next session.

Under item 5 of the agenda (Report of the Water and Forest Committee) the speakers were Ebermayer (Munich), Müttrich (Eberswalde), Bühler (Tübingen) and Hoppe (Vienna). Before giving the floor to the first speaker, the Chairman told the audience that Dr. Ebermayer could not attend the session and had asked to postpone the discussion. Therefore, after 3:00 p.m., the hosts offered the scheduled excursion around the Research Institute and Arboretum at Mariabrunn.

The Chairman closed the first session.

The second session was held on September 5, 1903, at Mariabrunn. It was attended by all the participants of the first session, except for Professor A. Müttrich, Member of the Governmental Council from Eberswalde. In addition, it was attended by several guests, including Dr. Baron von Beck, Head of a Division, Austrian Ministry of Agriculture; Dr. Kayser, Forest Expert from the

[60] Prototype of the permanent sample area.

[61] Further on, Kraft tree dominance classes are indicated as ranging from "dominant" (I) to "suppressed/dying and dead trees" (V).

German Embassy in Vienna; C. Oprau, Romanian Forestry Engineer; and J. Steiner, Seed Supplier from Wiener-Neustadt.

The second session started earlier because the agenda of the first day was not completed. The Chairman notified the audience of the cancellation of the excursion to the Schönbrunn parks, scheduled for the afternoon, due to lack of time.

A. Schiffel, Deputy Chairman, opened the session at 8:30 a.m. and read the greeting telegrams, including the telegram from Prince Karl Schwarzenberg, Privy Councillor Professor Ebermayer, Chief Forester Hawranek from Saar, Dr. F. Schneider from Munich and others who could not attend the session.

Professor A. Bühler from Tübingen reminded that the 2nd Congress of the International Union of Forest Experiment Stations (in Braunschweig, in 1896) had established a Committee consisting of Bühler, Ebermayer, Hoppe and Müttrich to investigate how forests influenced water, and in particular, how to prevent floods and avalanches. The Committee, chaired by Professor Ebermayer, had met in 1899 in Munich and became acquainted with the framework research program,which had been designed by Professor Bühler to study the effects of forests on water status. Specific tasks had been distributed among the team in the following way:

I. Müttrich: impact of the forest on precipitation rates;

II. Hoppe: estimation of precipitation amounts, reaching the ground in the forest;

III. Ebermayer: studies on soil moisture as well as the status and flows of ground waters in the forest and open spaces;

IV. Bühler: estimation of the quantities and speed of run-off and amounts of effluents in open spaces and in forests.

In addition, 3 groups were identified on:

1) key statistics from weather stations;

2) information from water management institutes; and

3) special-purpose meteorological observations in some forest management units.

Professor Müttrich noted that it had been difficult to select plots of the appropriate size (3,000 ha) and personnel (10-15 persons) to make the measurements. To measure the precipitation, about 100 rain gauges had been installed on six plots along the Marienwerderstraße, in Poznan, Opole, Frankfurt on the Oder, Magdeburg and Merseburg. The gauges had been placed in the forest (forest stations), forest glades (border stations) and in open spaces (field stations).

Dr. Hoppe reviewed the available literature and correlated the amounts of precipitation (rain and snow) reaching the ground surface with the following factors: tree species, age, crown status, closure degree, amounts of precipitation, wind and temperature. The literature did not provide sufficient data to estimate average values, but the information collected in the field made it possible to suggest that more water penetrated the soil during heavy rains than during insignificant precipitation, and that conifers retained more water than deciduous species. To improve the quality and precision of the measurements, it was necessary to have many small experimental plots with numerous gauges and keep this task on agenda for a long time in view of its high importance for both water resource management and silviculture. In addition, it was necessary to measure precipitation during long periods of continuous rains, to conduct comparative observations of snow thawing in and outside the forest, as well as to assess the dependence of the slope direction in mountains.

Professor Ebermayer had assessed the status and flows of underground waters jointly with the Royal Bavarian Institute and with input from the Water Engineering Bureau in Munich. O. Hartmann had participated in the work, and therefore he could tell the audience about the study in the absence of Professor Ebermayer. Then the speakers described the study site, focus, participants and results. In particular, O. Hartmann from Munich noted that the joint studies of the Royal

Bavarian Water Engineering Bureau had been underway for 22 years and included experiments both in the forest and open spaces. Drawing on recent observations of 1900-1901, many diagrams and tables were produced to show the cause-effect relationships between precipitation and ground water levels, seasonal fluctuations of the total precipitation, frosts and droughts, as well as soil humidity and permeability.

An example of thematic research was presented: this research, undertaken by Professor P.V. Ototzky (1866-1954)[62] from St. Petersburg in 1893 and 1895, assessed ground water levels in and outside the forest on flatland in South-Western Russia in black soil areas, and in the summer of 1897 in some forest areas in the St. Petersburg Province on moraines.

Professor Ebermayer summarized all observations, made by P.V. Ototzky, as follows:

1. In the horizontal surface and in the same geophysical area (in the steppe zone), the water supply to boost water sources is much weaker in the forest than in its surrounding forestless open spaces. Most wells and springs are found outside the forest.

2. In the forest, the groundwater level is always much lower than in the surrounding steppe even if it is covered with dense grass. The groundwater level goes significantly downward when moving from the steppe to forest. At the point of transition to the forest, the groundwater level abruptly drops, often at a short distance from the forest. For instance: near the *Shipov Les* Forest in Grishov, it was observed that at a distance of 130 m from the forest edge, the groundwater level was 10.96 m; in Laptev, at a distance of 32 m, it was 10 m; in the black forest near Sandrov at a distance of 200 m, it was 4.95 m; and in Zubilov, at a distance of 104 m, it was 10.72 m.

3. The groundwater level decreases as the forest stocking increases: the minimum decrease is found in young stands, and the maximum decrease is in closed stands of middle age (60-80 years).

4. Small glades may raise the groundwater level.

5. Forest cutting is followed by a gradual elevation of groundwater.

6. In northern Russia, the influence of the forest on the lowering of the groundwater level is generally less than in the steppe areas. It is clear that more and more precipitation leads to more water to the forest floor, and the water consumption and transpiration of trees are considerably reduced as a result of the cold and humid climate" (IUFRO 1903a p. 34).

To examine the status and movement of underground waters in the forest and open spaces, two respective experiment fields had been set aside in Bavaria: one of them was located in Mindelheim (in Schwaben), and the other one in Wendelstein, near Nürnberg.

The presented information was discussed by Professor Ramann, Professor Mayr from

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[62] In the original (p.34): I. Ototzky.

Pavel Vladimirovich Ototzky was a prominent Russian geologist and soil scientist, he participated in Dokuchaev's Expedition, and was the publisher and first editor (1899-1916) of the *Pochvovedenie* (Soil Science) Journal. Drawing on his own studies, he produced a generalized forest hydrology review, covering the groundwater origin, life and distribution (Отоцкий 1906). After the year 1917, he lived abroad, and was buried in Stockholm (Чесноков 1997, Fedotova, Hakkarainen and Hallberg 2014).

Probably, E. Ebermayer was familiar with P.V. Ototzky's publication about the soil and geology of the Shipov Forest («Шипов лес: почвенно-геологический очерк». Спб.: Тип. Е. Евдокимова, 1894. 52 р.), or his hydrological study in Vorontsovka («Гидрологический очерк Воронцовки»,1894), or his paper about the hydrology of steppe forests («Гидрологическая экскурсия 1895 г. в степные леса», 1896), or his essays on soil science («Очерки по почвоведению», 1897) or his article about forest influence on groundwater («О влиянии леса на грунтовые воды», Почвоведение, 1899, № 2).

Arseniy A. Yarilov (1868-1948), Professor of Soil Sciences, Moscow State University, pointed out directly: "Similar studies that used the Ototzky's method have been made in various other countries: in Germany (by Prof. Ebermayer), in France (by Prof. Henry), in India (by Pearson), in Sweden (by Prof. Hesselmann), in Romania (by Prof. Murgoci), etc.; all of them confirmed the Ototzki's results» (Ярилов 1922, p. 61).

Munich, Chief Forester Siefert from Karlsruhe, Professor Hartmann and others. Councillor Friedrich proposed to end the discussion due to lack of time. Professor Bühler asked the Congress to adopt a decision on that issue. Professors Schiffel, Bühler, Schwappach and Mayr worded the decision as follows:

"The 4th Congress of the International Union of Forest Experiment Stations discussed the report of the Committee on Forest and Water Research, consisting of Professor Bühler, Professor Ebermayer (Privy Councillor), O. Hartmann from the Construction Department, Chief Forester Siefert, Dr. Hoppe and Professor Müttrich (Privy Councillor); its participants would like to thank them for the detailed and comprehensive report, and want this matter to be included in the agenda for the next session in view of its critical importance" (IUFRO 1903a, p. 47). The proposal was unanimously adopted.

Then, the participants returned to the postponed 4th item of the agenda (Development of a universal forest bibliography). The speaker (Adjunct Flury from Zurich) noted that in the past 50 years, there had been a significant increase in the number of forest-related publications; publishing houses and periodicals were producing catalogues, including the *General Forest and Hunting Newspaper*, which disseminated such overviews for an additional annual fee.

There was a specialized organization, called *Concilium Bibliographicum*, that provided its subscribers with information about publications in the format of catalogue cards, which could be grouped ("beaded") in different ways – for instance, on a thematic basis.

There was a list of 10 key areas (areas of the first order), underlying the classification of all literature: 0. General Section; 1. Philosophy; 2. Religion; 3. Social Sciences; 4. Philology; 5. Natural Sciences; 6. Applied Research; 7. Fine Arts; 8. Fiction; 9. History.

Forest science was assigned to section 6 (applied research) and had its own subsection – 62[63]. Therefore, all publications in forest science and related areas had codes which started with 62. The *Concilium Bibliographicum* offered the following subsection for forest bibliography: 0. General Aspects; 1. Silviculture; 2. Theory of Increment and Growing stock; 3. Forest Management, Forest Assessments, and Statistics; 4. Forest Uses; 5. Forest Fire and Pest Management; 6. Forest Policies, Administration, Legislation and Institutes; 7. Forest Machine-Building; 8. Basic and Auxiliary Sciences; 9. Hunting, Fishing and Bird Protection.

Then, the speaker provided a detailed description of lower-order sections, noting that subscribers of the *Concilium Bibliographicum* were to pay five centimes per card if up to 100 cards (while labels) were bought and CHF 30, if over 3000 cards were bought. The question remained open as it was not clear whether experiment stations were willing and could afford to take that additional burden of costs.

Professor Bühler presented a draft decision which read: "the International Union will (1) create and maintain an overall forest bibliography; (2) introduce a decimal classification with references to the *Concilium Bibliographicum*; (3) appoint a Committee, on the one hand, to create an overall forest bibliography and, on the other hand, to hold negotiations about the subscription to the *Concilium Bibliographicum*; and 4) convey the Committee's decisions to all the members of the Union" (IUFRO 1903a, p.50).

Engineer K. Böhmerle, Co-Chair of the Session, agreed with the arguments, contained in Flury's report, but proposed to refrain from including item 3 in the decision. During the discussion, the floor was given to Neumeister, Bühler, and Schwappach. Oppermann in particular noted that if

[63] Later, forestry and silviculture were included in section 630 of the Universal Decimal Classification of Literature, i.e., in the Russian language under Subsection 63: Agriculture. Forestry. Wildlife Exploitation. Fishery.

the catalogue were to include not only deeply meaningful but also minor publications in English, French and German, it would create problems for experiment stations.

Professor G.F. Morozov agreed with Oppermann, and said that he hoped the reports would be published both in the format of research papers and of short articles about forestry research. He said that it was necessary to start publishing an international journal to that end.

Dr. Cieslar pointed out that Oppermann and Morozov proposed something different from what was under discussion in that case, saying that, unfortunately, forestry was currently not in the most advantageous position. Therefore, publishing of abstracts in periodicals would make the managerial work significantly easier (*ibid.*, p. 51).

As a result, Schwappach's proposal was adopted in the following wording: "The International Union of Forest Experiment Stations has appointed a Committee to explore the situation in order to identify the settings for the creation and maintenance of a forest bibliography". The Committee consisted of Adjunct Böhmerle, Adjunct Flury and Chief Forester Neumeister. The Committee was granted to right to co-opt additional members.

After lunch, the audience reviewed the initial agenda for September 5, 1903 (IUFRO 1903b). An excursion to the Schönbrunn Park was scheduled for the afternoon, and a farewell dinner was to be held in the Grand Hotel in Vienna that night.

The agenda included the following:

1. Results from studies to investigate the distribution of main forest species. Speakers: Dengler (Eberswalde) from the German Empire, Fekete (Schemnitz) from Hungary, and Cieslar (Mariabrunn) from Austria;
2. Results of field trials of exotic tree species in Europe. Speakers: Mayr (Munich), Sommerville (London) and Cieslar (Mariabrunn);
3. Collective seed procurement for seed provenance studies. Speakers: Mayr (Munich) and Cieslar (Mariabrunn);
4. Procurement of reliable good-provenance seeds to meet forestry needs. Speakers: Neumeister (Tharandt) and Cieslar (Mariabrunn);
5. Decision on when and where to hold the fifth Meeting of the International Union of Forest Experiment Stations. Election of Chairman and Deputy Chairmen of the Union.

Under item 1 of the agenda, the floor was given to Dr. Dengler from Eberswalde who noted that he intended to present research outputs only for Northern and Central Germany, rather than those for Germany as a whole. His reason for this was that similar studies for Saxony and for the beech in Southern Germany had been published under the editorship of Professor Mayr in Tharandt. However, he could demonstrate a distribution map for pine, spruce, fir, larch, beech, sycamore and European holly.

Dr. Fekete from Schemnitz pointed out that the available studies, related to tree species distribution in Hungary, called for additional investigations of vertical species distribution – in particular, in the Hungarian Carpathians and Alps. The available studies also called for the identification of the horizontal border lines of some Alpine species which did not occur in arid flatland areas or along rivers, including borders reached by the species near the Hungarian north-western frontier.

The third speaker, Dr. Cieslar, talked about the status of studies to analyse the horizontal and vertical distribution of main tree species in Austria. In Austria, the relations among the species were much more complicated than in Germany and Hungary which was primarily attributable to the geographical conditions in the Austrian Alps near Tirol, Salzburg, Upper and Lower Austria, Styria, Carinthia – and, partially, flatland, which complicated the investigations of the horizontal, and, especially, vertical distribution.

Professor Schwappach summarized the presented information and noted that questions about the tree species distribution were still awaiting answers, and many results could not be achieved only through individual efforts. It was for this reason that the International Union of Forest Experiment Stations had been discussing such issues at it meetings.

The discussion of item 2 was led by Dr. Neumeister.

The first speaker was H. Mayr from Munich who narrated the history of tree species introduction, dating back to more than a century earlier. He included both victories and defeats, the latter of which were primarily failures to achieve expected results. Trying to identify reasons for such failures, the speaker referred to the absence of planning for experiments and reliance only on silvicultural knowledge about species. He said that another reason was the competition with local species, which was deemed to be temporary competition between locally predominant forest species and exotic (introduced) species. The third factor was the 'attitude' of local forest wildlife (mice, rabbits, deer and big game) to exotic species. Field trials had started 35 years before in Bavaria, and since 1880, they had been undertaken in many other forests in Germany and were supported with scientific evidence.

Then, the speaker described experiments and respective publications about silvicultural aspects, relating to American, Japanese, Russian, Indian and South-European tree species. In particular, among Russian species, the Siberian larch generated the greatest interest as it differed from many introduced species. This difference was due to such properties as fast growth, good stem shape, resistance to many diseases and insect pests. In addition, the studies covered the European larch and Dauria larch. It was noted that the Caucasian fir (*Abies nordmanniana*) had slight advantages in comparison with German firs, but it was less frost-hardy. As regards Oriental spruce (*Picea orientalis)* and European spruce (*P. obovata*), they had no advantages at all.

In conclusion, the speaker worded five key objectives, reflecting the following needs: to design climate-specific and site-specific cultivation methods; to cultivate only those species which had noticeable advantages and were of higher economic value in comparison with endemics; and to build experiments in such a way which would make behaviours of the introduced species demonstrate their prosperity or poor growth.

The second speaker (Dr. Sommerville from London) drew attention to the fact that though Great Britain was a sparsely forested country, many problems could be seen from a historical perspective. To illustrate this, he pointed to the role played by David Douglas, who per request of the Royal Horticultural Society had travelled across America. In 1826-27, he explored the continent's north-western regions, and then, in 1829, he visited California. Mr. Douglas tragically perished in the Sandwich Islands on July 12, 1834. Botanists were grateful to David Douglas for his descriptions of many high-value conifers such as *Pinus insignis, P. coulteri, P. lambertiana, P. inonticola, P. ponderosa, Abies amabilis, A. bracteata, A. grandis, A. nobilis, Picea sitchensis* and *Pseudotsuga douglasii.* The speaker told the audience about other prominent botanists, scientific discoveries, and experiments with imported seeds in England. He discussed the specifics of many exotic tree species growing in England at the time, taking into account such details as tree size and growing stock of their stands.

The last speaker (Dr. Cieslar from Mariabrunn) was short on time, and was therefore rather brief. He noted that recent Austrian experiments with exotic species were limited to a small number of tree species. Further on, Dr. Mayr from Bavaria mentioned that *Juglans cinerea* is less difficult to transplant than *Juglans nigra* because of a more favorable root development, and that *Juniperus virginiana* flourishes in Dalmatia.. *Pinus strobus* is suitable for protective forest not only in damp to wet locations, but also on quader sandstone soils. Regarding *Chamaecyparis lawsoniana*, the speaker had observed that it was not attacked by *Agaricus melleus* more than spruce; *Pestalozzia*

funerea had not proved as dangerous to this type of wood in Austria as it had been reported to be in Germany. *Picea pungens* had proved itself to be less damaged by browsing by wild game than indigenous spruce by virtue of its stiff and prickly needles, a circumstance which deserved to be considered from an economical perspective. The speaker referred to his publication on that theme.

In view of the late hour, Professor Schwappach closed the debates and the Chairman of the Union J. Friedrich had to propose to exclude items 3 and 4 from the meeting's agenda. The Chairman also proposed to appoint Dr. Cieslar from Mariabrunn and Professor H. Mayr from Munich to act as speakers on the topics (IUFRO 1903a, p. 76). Chief Forester Neumeister (who moderated that session) thanked the colleagues for the preparation of their reports, on behalf of the Union.

Resolutions

No general resolution was adopted.

Organizational matters

In view of the expansion of the Union, the agenda included a discussion on how to revise its key Statutes, which at the time were very concise and rather general in nature. It was necessary not only to clarify the goals of the Union, but also to mobilize financial resources for its operation. These funds could be collected through incremental efforts, including accession fees in accordance with the Statutes. Prior to that Congress, only countries could be members of the Union. The amended Statutes enabled forest experimentation institutions (instead of countries alone) to become members of the Union (Speer 1972). The work under item 2 of the agenda resulted in the approval of the following conclusions in the *Statutes* and *Internal Regulations*:

§1. The title of the Association is *International Union of Forest Experiment Stations.*

§2. The aim of the Union is to promote forest experimentation through:

1) holding meetings of representatives from associations of forest research institutions and experiment stations as well as forest experiment sites, in which attendees would discuss research-related issues and research methods – and, as appropriate, prepare joint work plans;

2) sharing publications of the Union's members; and

3) undertaking other useful actions.

§3. The Association consists of government research institutions, which submit declaration(s) of their accession to the Union to the Chairperson in accordance with §4 of its Statutes.

§4. The management team of the Union includes the Chairperson and Deputy Chairperson, who is responsible for office management in the absence of the Chairperson. Each meeting shall elect a new management team.

The term of their office (Chairperson and Deputy Chairperson) shall expire at the end of the last meeting.

The management team shall issue invitations to participate in meetings of the Union, prepare the meetings, moderate discussions, maintain correspondence, implement the Union's decisions, be responsible for reporting and negotiations, represent the Union externally, and undertake cash transactions.

§5. Resources to cover the Union's administrative costs shall be raised by: levying annual membership subscriptions/fees, with their rates to be established by the Congress; and by any other ways.

§6. Dates and venues for each next Congress shall be determined at a general gathering. In the event that it is not possible to make a decision in such a way, the decision shall be made by the Chairperson.

§7. Discussions shall be based on parliamentarian procedures; other languages [aside from German] may be used.

Meeting reports shall be prepared in the German and French languages.

§8. Agenda items and agenda for each meeting shall be defined by the Chairperson. The Members of the Union who registered most recently will be required to to submit their proposals with respect to the agenda 30 days in advance. However, meeting procedures and sequence shall be defined by the Chairperson.

§9. Each Member-Organization may delegate any number of its representatives who shall vote during discussions on scientific and administrative matters; but only the leader as the representative of the country, appointed by the Chairperson, shall have the right of vote[64].

Meetings, trips and scientific discussions may be attended by representatives of one and the same experiment stations, but without the right of vote.

§10. As per proposal of the Chairperson, individual technical topics of the agenda may be modified during the Congress through voting, based on a simple majority of votes of the chosen meeting participants.

§11. At meetings, implementing the Union's administrative decisions shall be mandatory if at least two thirds of the participants vote for them.

Scientific decisions of meetings shall be adopted by a simple majority of votes" (IUFRO 1903b, p. 423-424).

The adoption of the above new Statutes and Internal Regulations of the International Union of Forest Experiment Stations meant that item 2 of the agenda was fulfilled. Thereafter, in accordance with §9 of the Statutes, the Chairman listed the Leaders of the Member-Organizations (IUFRO 1903b, p. 424-425)[65]:

From Baden: Siefert;
" Bavaria: Mayr;
" Belgium: Crahay;
" Denmark: Müller;
" England: Sommerville;
" Austria: Friedrich;
" Prussia: Schwappach;
" Russia: Morosoff;
" Saxony: Neumeister;
" Switzerland: Engler;
" Thuringia: Matthes;
" Hungary: Vadaš;
" Württemberg: Bühler.

It should be noted that the list of the Leaders did not include representatives from Japan and Norway, who attended the Congress as guests.

Addressing agenda item 5, J. Friedrich, current Chairman of the Union, proposed to convene the next meeting in Belgium. He also proposed to elect Mr. Dubois, Director General of the Forest and Water Management Enterprise, as Chairman, and Forest Inspector Crahay as Deputy Chairman. This resolution was unanimously adopted.

Speaking French, Belgian representative Crahay said that the decision to choose Belgium as the host country for the fifth meeting was a great honour for his country. At the same time, he noted that Belgium was not yet fully prepared to host such events due to insufficiently developed forest experimentation there. He also commented that Belgium would not be able to demonstrate

[64] Voting rights based on *the principle of one organization one vote*.
[65] The countries are listed in the same order as in the original: in the German alphabetic order.

sufficiently interesting sites during the meeting, as that there could be some transportation- and language-related difficulties. But he assured the attendees that Belgian foresters would do their best to host the meeting successfully. On behalf of Mr. Dubois and on his own behalf, he thanked the meeting for the honour to be elected Chairman and Deputy Chairman of the International Union of Forest Experiment Stations.

Finally, the meeting considered membership fees: they concluded that fees were to be paid by each member (i.e., each Forest Experiment Station) on an annual basis pursuant to §5 of the Statutes and Internal Regulations of the Union. Mr. Vadaš proposed to set the rate of such fees at DM 25 and the proposal was endorsed through roll-call vote.

Then, Councillor Friedrich, Chairman of the Union, heartily thanked the participants and announced that the meeting was closed.

Excursions

A 53-page booklet was prepared for participants of the excursions; it contained the Meeting Program, list of the excursions with the names of the sites to be visited and train schedule as well as descriptions of the experiment sites. The booklet also described devices, tools, and methods; and provided other information, including tables with measurement data (IUFRO 1903c).

According to the program, between the two sessions, on August 31, 1903, the meeting participants visited the Forest Institute in Mariabrunn – specifically, its three laboratories (those dealing with chemistry, technology and entomology) and the Botanical Garden. The excursion was led by: Dr. Lorenz in the Chemical Laboratory of Auxiliary Substances; Dr. Janka in the Laboratory of Technology; and Dr. Sedlaczek in the Entomological Laboratory. Dr. Cieslar informed the participants about experiments in the Botanical Garden.

On the morning of September 1, 1903, delegates departed from the Southern Railway Station in Vienna for the excursion and arrived at the site by lunch. On that day, they saw interesting forest plots and spent the evening in Puchberg. The next day, they climbed up the Kalkalpen (in the Limestone Alps), the highest summit in Lower Austria (2,061 m), to examine stands of the Austrian (black) pine and Scots pine at an elevation of 1,450 m. They also examined stands of fir and larch at an elevation of 1,500 m; that of spruce at an elevation of 1,610 m; and that of mountain pine at an elevation of 1,916 m.

On September 2, 1903, at 5:30 a.m., the excursion group departed for Urschendorf. In the Wiener-Neustadt Municipality, they visited a well-known pine forest in Föhrenwald (Großen Föhrenwald). They also visited sites of: drainage experiments in black pine stands, growing in poor site conditions with and without waterlogging; experiments with fertilization, using nutrients in different combinations; and experiments with such silvicultural treatments as soil raking.

In addition, they visited experiment sites in plantations of spruce, northern white pine, and Jack pine (*Pinus banksiana*), including old Jack pine stands. Then, they visited stands of the black Austrian pine (*Pinus laricio austriaca*), experimental spruce plantations from seeds of different origins (Austria, Silesia and Sweden), and thinned stands. After that, they went to a national forest in Ofenbach to become acquainted with thinning results in young pine plantations. In the evening, they departed for Vienna.

In the morning of September 3, 1903, the excursion group went by train to Purkersdorf to see forest plantations and thinning experiment sites in beech forests (thinning at different ages and of different intensities). They also visited experiment sites designated to assess the influence of various thinning modes on the growth of young stands; sites in beech forests and spruce forest plantations where the French thinning method had been modified; experiment sites in oak (*Quercus tardissima* C.) plantations with different distances between and within rows; experiment sites to mix the Alpine

and Sudetes larches, Alpine and Siberian larches with various exotic species; sites, and designated for experiments with spruce from seeds of different provenances.

In many cases, the demonstration was focused on the performance of introduced species in order to illustrate the discussions on the agenda. For instance: 10-years-old plantations of the Lawson Cypress (*Chamaecyparis lawsoniana*) and western redcedar (*Thuja gigantea*) served as a promising picture of good growth. The Lawson Cypress exceeded 3 m in height and the highest red cedar reached 4 m. In juniper (*Juniperus virginiana*) plantations, aged 9 years, the tree height was 2 m; and a hickory (*Carya alba*) plantation, aged 10, had entered into the period of rapid growth in height. The guide therefore noted that it took a good deal of patience to cultivate the hickory at its young age. In this context, it would be of interest to look at a comparative description of introduced species growth in Austria.

Most provenance study plantations for comparative studies were established in 1896-1897. One series included the Siberian larch. In particular, many experiment sites were described, using a more or less similar pattern. For instance, experimental forest plantations located in sites 61 and 60: Northern slope; elevation, ranging from 350 to 450 m; primarily, fresh (fairly moist) loamy sand soil with selected areas of shallow and compacted soil; some areas, located on wetland with the alder and acid grasses. Another comparative experiment with cultivation of Siberian and Alpine larch: plantations, established in April 1902, using four-years-old plants:

- Siberian larch (*Larix sibirica*): 448 plants, 15 cm high on average as of the autumn of 1902; very slow growth. The seeds were provided by the Russian Imperial Ministry of Agriculture and State Property;
- Alpine larch[66] (*Larix decidua*). 657 plants, 77 cm tall on average as of the autumn of 1902.

For comparison purposes, the handouts for the excursion described a parcel in a plantation of another larch race:

- Japanese larch (*Larix leptolepis*): plantations, established in 1897 with 3,418 plants; as of the survey date, about 3,000 survivors at age of 10 years; 4.5 m high canopy; some trees, reaching 7 m in height; height increment as measured in 1902 was 80 cm on average, with over 100 cm increment in some trees; significantly damaged by *Armillaria*, almost annual severe outbreaks of *Coleophora laricella*, and occurrence of *Grapholitha zebeana*. Based on the forest health assessment, it was recommended to start thinning in several years to harvest larch poles.

The provenance study plantations included other species (the figures in brackets are the years of the establishment, the number of young plants and height in cm as of 1902):

- *Pseudotsuga douglasii* (1902, 1345, 20 cm);
- *Abies balsamea*:
    - (1902, 714, 29 cm);
    - (1898, 440, 74 cm (average, 150 cm (max.), height increment – 40 cm);
- *Abies nordmanniana*:
    - (1902, 177, 23 cm);
    - (1898, 2 plots 300 trees each, 40 cm);
- *Chamaecyparis pisifera* (1897, 135, 125 cm);
- *Chamaecyparis lawsoniana* (1897, 890 with 800 survivors, 1.5 m (average) – 3.5m (max));
- *Thuja gigantea*[67] (1897, 2600 with 2,100 survivors, 1-3 m (average) – 3-5 m (max.));
- *Juniperus virginiana* (1897, 1300 with 1,200 survivors, 1-3 m (average) – 3-5 m (max.)).

At the end of the day, the participants were transported in carts to Gablitz, where the Imperial

[66] Names like Alpine larch (*Larix decidua*), Polish larch, Sudetes larch or Tatras larch, only show the location of the occurrence of the European larch. They might also differ in wood structure and properties.
[67] Common names: Western red cedar, Canadian red cedar, etc. Latin name: *Thuja plicata* Donn ex D. Don.

and Royal Directorate hosted a dinner in honour of the Delegates of the Congress. Then, the Delegates returned to Vienna by train in the evening.

In the morning of September 4, 1903, the participants went by train to Purkersdorf. On that day, they visited the Purkersdorf and Untertullnerbach Forest Districts to examine: experimental naturally regenerated mixed stands of red and white oak, aged 35; experiments with thinning in young stands; experiments to measure the growth in spruce stands, as well as intensive thinning in spruce stands, aged 18. At the end of the day, they saw and admired graceful fallow deer and roe deer. At night, they returned to Vienna.

Russian participation

Professor G.F. Morozov represented the Russian Empire for the second time. He participated in discussions and the excursions.

A photograph made during the excursion in the Austrian Forestry and Hunting Newspaper (*Österreichische Forst- und Jagdzeitung* 1903, Wien, 18 September 1903, No. 38, S. 321), depicted Professor Morozov among the Congress participants. This photo was unknown in foresters' circles of modern Russia.

Interesting facts

It was for the first time that IUFRO papers included reports of measurements in provenance study plantations.

Much attention was paid to relationships between the forest and moisture as well as to the role of studies, undertaken be Russian scientist P.V. Ototzky and proven by forest researchers in other countries .

Initially, it had been proposed to hold the next meeting in Belgium and to elect at that time its representative as Chairman of the Union for the period between the Congresses. Later, it was Professor Anton Bühler, representative of Germany, who was elected Chairman (1904-1906), and it was decided to hold the meeting in Stuttgart.

It is likely that Belgium was not yet prepared to comply with the newly adopted Statutes of the Union, and therefore handed over the reins to Germany, as the latter had longer experience of international cooperation. Disappointing though this may have been, it did give Belgium additional time for better preparation for such an important international event.

Chapter 8
Congress V – September 8-16, 1906, Stuttgart and Ravensburg, Germany

Information for this Chapter is primarily derived from the Program and Minutes of the 5th Congress of the International Union of Forest Experiment Stations, as published in Tübingen by H. Laupp (IUFRO 1906a, b).

The use of different sources led to variant readings of many aspects of the meeting, including the composition of participants, and the number participating countries. It refers primarily to the representation of Russia and the USA.

Overview

The efforts to attract new members to the Union turned out to be fruitful. The Congress brought together 40 delegates from 10 countries, if all the German Lands are taken for one country. If the German Lands are considered individual countries, then the total number becomes 17: Alsace-Lorraine, Austria, Baden, Bavaria, Belgium, Bulgaria, Denmark, France, Hessen, Hungary, Prussia, Russia, Saxony, Switzerland, Thuringia, the United States of America (USA), Württemberg. 93 persons were on the full list of invited people/participants (IUFRO 1906c, p. 2-4); and it is noteworthy that Bulgaria and the United States of America were new members of the Union.

The agenda included 4 sessions, 8 reports and 8 excursions, of which 4 were full-day excursions and the other 4 were scheduled for afternoons only, as their destinations were limited to suburbs of Stuttgart and Ravensburg.

In addition, on September 8 – 12, 1906, the Institute of Technology hosted a display of about 400 humus specimen. That exhibition was highlighted by G.F. Morozov in his speech about the Congress at a meeting of the Forest Society in St. Petersburg: "The centrepiece of the meeting program was related to *humus;* very rich collections were demonstrated" (Морозов 1906b, p. 1067).

Participants were asked to arrive on Friday, September 7, 1906, and book hotel rooms in the Victoria Hotel (near the railway station in Stuttgart) for September 8 – 11, 1906. Taking into account the destinations of the excursions, it was suggested that participants should book rooms in the Adler Hotel in Ellwangen for September 12, 1906, and the Hildebrand Hotel in Ravensburg for September 13-15, 1906. To cover all the expenses on tickets, car rent, and meals in the hotels, it was proposed that general travel expenses would be covered in part through advanced payments. In addition, the option of buying travel cards for 15 days was suggested, with variations depending on the carriage class. It was proposed to arrange for the delivery of all luggage from Stuttgart to Ellwangen and then to Ravensburg in a centralized mode (IUFRO 1906c).

Scientific program

On Saturday, September 8, 1906, the participants visited the display of humus specimens, tools, and demonstration materials from the Forest Experiment Station and the Institute of Technology. In the evening, they gathered for a house supper. G.F. Morozov, a participant from Russia, noted later that "the Congress had been attended by the King of Württemberg and that the participants had been greatly impressed with the ease and simplicity of his communication with people" (Морозов 1906b, p. 1068-1069).

The first session of the Congress started on September 10, 1906, at 8:15 a.m. in the conference hall in the Institute of Technology in Stuttgart. It was attended by 28 delegates from research institutions as well as 12 foresters and specialists from Stuttgart. Chairman A. Bühler opened the session and welcomed the participants. Dr. von Graner, Director of Forests, welcomed the audience on behalf of the Government of Württemberg, his Excellency Honourable Minister of Finance and his Excellency Minister of the Church and Education. Professor Sauer welcomed the audience on behalf of the Institute of Technology.

The meeting adopted the proposal of the Chairman to elect Dr. Hähnle, Forest Superintendent from Stuttgart, and Dr. Kern, Forest Assessor from Tübingen, as Secretaries.

The participants stood up to pay tribute to the memory of deceased Professor Müttrich from Eberswalde who had died after the previous Congress.

Then, the Chairman listed the Experiment Stations whose representatives could not attend the meeting, and handed over printed products of the Württemberg Research Station, including a Guidebook for Excursions.

Other issues, including the agenda, were addressed through voting in accordance with §9 of the Statutes. In particular, the meeting adopted the presented proposals on forest bibliography (Flury), on sharing of research-related photographs (Zederbauer), and on publishing of a joint forest review (Oppermann). The sequence of agenda topics (reports, lectures) was slightly modified.

At 8:40 a.m., Professor Engler from Zurich delivered his report under the first item of the agenda (Influence of the forest on the direct runoff) which was also highlighted by G.F. Morozov in the above mentioned lecture during the meeting of the Forest Society in St. Petersburg (Морозов 1906b). Professor Engler showed many diagrams and pictures when he presented his report.

At 10:20, a.m., Professor Schwappach delivered his report, titled *Languages to be used in publications of Forest Experiment Stations in addition to the native tongue*[68]. He referred to the practice of the Swedish Forest Experiment Station to supplement its publications with abstracts in German. Professor Schwappach suggested that the Union recommend that all Forest Experiment Stations writing abstracts be written in German and French, rather than in English because the English forest terminology was not sufficiently well developed yet (IUFRO 1906b, p. 86).

At 10:30 a.m., the discussion of the report began. Professor Engler stated that the use of the English language would be acceptable because it was widely spread in many countries; he also referred to numerous publications in English in America. Zederbauer supported Engler, saying that forest terminology did actually exist in English. Engler requested that Professor Schwappach's proposal be modified such that it added English to the list of acceptable languages for abstracts of publications. Schwappach repeated that his view was informed by the fact that the English language had not such developed forest terminology as did German or French. Professor Bühler proposed a trade-off definition, using the words 'and even' pertaining to English, thus indicating to the preferential use of German or French. The voting resulted in the adoption of the Chairman's proposal (16 delegates voted for it and 8 delegates voted for Engler's proposal). The session was closed at 10:45 a.m. and its participants went to the excursion to Lustnau in the vicinity of Tübingen.

The second session started on September 12, 1906 (at 8:10 a.m.) in the Institute of Technology. Professor Bühler opened the meeting and gave the floor to his Excellency Minister of Culture Fleischhauer, who welcomed the participants.

Professor Potonie from Berlin and Professor Vater from Tharandt reported about the humus display (item 3 of the agenda). Their co-author was Dr. Muller from Copenhagen.

During the discussion of the humus display, Professor Schwappach provided historical

[68] The paper was listed under the 5th item in the agenda and its discussion was scheduled for September 12, 1906 (IUFRO 1906c, p. 8).

evidence related to various aspects humus research, including the nomenclature. The Chairman also distributed copies of Issue #10 of the Forest and Hunting Journal (1906) with proposals on how to classify and denominate humic substances collected for practical use. The proposals were prepared by E. Ramann (IUFRO 1906b, p. 92)[69].

Then, a discussion developed around comparative advantages of the classifications, proposed by Ramann and Potonie. E. Ramann pointed out that it was easier for foresters to comprehend his approach as "a small collection of terms was much more practical for foresters" (*ibid.*, p. 93). It was deemed expedient to put nomenclature-related issues on international agenda instead of confining them to the intra-German discussion, and that proposal was supported by the session.

A presentation about methods to study wood properties (item 4 of the agenda) was made by Professor Janka, who used many illustrations. Professor Janka suggested that the International Union of Forest Experiment Stations should consider the durability of wood when assessing its quality, and also invited Members of the Union to take part in such studies.

The session was closed at 10:45 a.m., and participants took an excursion to the Schrezheim Forest Management Unit, located to the north of Tübingen.

The third session was held on September 14, 1906 in Ravensburg, which was located at a distance of about 90 km from Tübingen. At 8:25 a.m., Chairman Bühler opened the session and gave the floor to Adjunct Professor Flury to report about forest bibliography. A committee on bibliography had been established earlier, consisting of Neumeister, Crahay, Böhmerle and Flury. But the committee had not met earlier, and Dr. Flury presented his own viewpoint: he noted that in the "sea" of thematic publications which were circulating at the time, a system was needed to readers navigate a range of forest publications. A bibliography was needed; furthermore, collections of thematic literature should be published because it was not sufficient to publish only abstracts as annual attachments to forest journals (IUFRO 1906b, p. 96).

He described two systems for bibliography preparation: 1) a catalogue book; and 2) a card index/catalogue; the latter was preferable. He then explained the system of Melville Dewey, Director of the New-York Public Library, who used a decimal classification for the card catalogue; such a system worked well. After that, the possibility of collaborating with the Zurich Organization, called *Concilium Bibliographicum*, to develop a forest bibliography was discussed. Specifically, the meeting's participants reviewed the letter from the Zurich Organization's leader, D.H. Jordan. Jordan had provided a detailed description of the terms and conditions for such collaboration, including financial arrangements.

After the discussion, Dr. Flury articulated the decisions to be adopted by the Congress:

1. The International Union of Forest Experiment Stations supports the idea to develop a common forest bibliography;

2. Forest bibliography is based on the decimal classification, which is used by Melville Dewey, recognized by numerous literature institutes, and is becoming increasingly wide-spread;

3. When bibliography committees are established, appropriate (organizational and financial) measures should be taken to address the matter as soon as possible.

Then, G. Janka read the opinion of Professor Böhmerle who could not attend the Congress. Professor Böhmerle advised against collaboration with *Concilium Bibliographicum* because its operation was limited to currently published literature and did not include earlier published literature which was highly important for foresters. For that reason, he expressed the following request: "In view of the critical importance of developing a common bibliography for forestry, the 5th Congress

[69] *Der Zeitschrift für Forstund Jagdwesen* 1906 Heft 10: „Vorschläge für Einteilung und Benennung der Humusstoffe. Für den praktischen Gebrauch zusammengestellt von E. Ramann".

of the International Union of Forest Experiment Stations should do the work under the program in the nearest years for the benefit of research and practice,..." (*ibid.*, p. 98). Dr. Flury did not recommend setting up a new committee on bibliography lest time was lost. Since both proposals (those of Flury and Böhmerle) were similar in contents, the Chairman proposed to set up a committee to continue preparing the report at the next Congress.

During an open discussion, Professor Engler urged the Union to mobilize funding for that work as soon as possible. Professor Huffel said that France had already completed such work for the French literature, published prior to 1888; this would reduce the costs of the entire project. Professor Bühler stressed that in Zurich, all literature had been already included in the card catalogue. It was noted that some expenditures could be covered by forest alliances, possessing significant financial resources, such as the German Association. As a result, steps to find financing need not be perceived as hopeless efforts. The decisions on all the items of the discussion were unanimously adopted through voting.

Due to lack of time, the report of the soil and plant ash analysis was excluded from the agenda (item 7 of the agenda for that day, speaker: Professor Ramann), and was instead included in the program for the next meeting.

Then, Professor Oppermann from Denmark narrated his eight considerations, concerning the preparation of an international review of Forest Experiment Stations. During the discussion, Professor Mayr pointed out that "numerous forest journals already contained such reviews; moreover, their publishing had been detrimental for book trade..." (IUFRO 1906a, p. 100). After that, Professors Wimmenauer, Ramann, Engler and Mayr (again) spoke. As a result, it was decided to give the issue a more detailed consideration and to make a final decision by voting in writing.

At 9:50 a.m., they passed to item 8 of the agenda (Procurement and testing of forest seeds; experiments and practices). The speaker (Professor Mayr from Munich) highlighted the status of research work in that field along the following two lines: (1) implementation of the 4th resolution of the 4th Congress of the International Union of Forest Experiment Stations about procurement of seeds from known origins, with a view to obtaining fuller knowledge about the influence of seed provenance on the quality of the seeds through precise experiments; (2) obligations of Forest Experiment Stations which were Members of the Union to undertake comprehensive studies to assess the influence of seed provenance on the quality of the seeds and cultivated stands as well as to support each other in procuring forest seeds.

The second speaker, Professor Schwappach, referred to the Scots pine (*Pinus sylvestris*) in order to demonstrate opportunities to find different varieties (sub-species, races of pine), and seeds, suitable for forest cultivation even if they were unevenly distributed across a region. The pine was of primary importance for forestry, and that was why he talked about the need to expand field trails. In doing so, he relied on the decisions of the 1900 Congress to assess the influence of seed provenance from the perspective of the morphogenesis and emergence of races. Studies had showed that seed germination and germination capacity significantly depended on seed sources. It was difficult to define those characteristics more specifically, using ordinary methods and procedures of agricultural trial laboratories as prescribed in the respective technical regulations of the Union of Agricultural Experiment Stations (IUFRO 1906a, p. 103). Therefore, the Union should 1) include studies related to forest seed germination in work programs of Forest Experiment Stations; and 2) adhere to agreed, uniform research principles.

Professor Mayr also thought that experiments were of high scientific value only if seeds were collected by government agencies or research institutions on their own, rather than procured from seed suppliers (*ibid.*, p. 104). His opinion was shared by all participants. Other contributions to the discussion were made by Schwappach, Engler, Crahay and others.

Upon completion of the discussion, the participants identified the stations and countries which were ready to undertake experimental seed trials: Austria (Friedrich), Thuringia (Matthes), Hungary (Vadaš), Switzerland (Engler), Bavaria (Mayr), Russia (Morozov), Belgium (Crahay), Württemberg (Bühler), Prussia (Schwappach), Hessen (Wimmenauer) and others. Their geography was expanding.

The 9th item of the agenda (a report of Dr. Matthes, Forester from Eisenach, about studies related to tree root growth) was postponed till the next day. At 11:15 a.m., the participants started to discuss where the next Congress would be held (item 10 in the agenda). The floor was given to Professor Crahay who offered, on behalf of the Government of Belgium, to host the next Congress, and the meeting unanimously approved it. It was also taken into account that Brussels would host the World Exhibition in 1910. The session was closed at 11:20 a.m., and its participants went to an excursion to the Baindt Forest Management Unit near Ravensburg.

The last (fourth) session started at 8:00 a.m., on September 16, 1906, in Ravensburg. Its purpose was to address the 9th item of the agenda. The floor was given to Professor Matthes to report about tree root growth studies. The report was not discussed due to lack of time: at 8:15 a.m., the participants resumed the discussion about publication languages (item 5).

The meeting unanimously adopted the proposal, put forward by Dr. Schwappach, to use one of the three languages to provide brief information about the contents of publications. Then, the Committee on Forest Bibliography was officially established; clarifications about the humus generation were recorded; and Forest Experiment Stations provided descriptions of their humus-related research and the use of nomenclature.

At 8:40 a.m., Dr. Flury addressed the 6th item of the agenda, speaking about the demands of research and practice for developing experimental volume tables. His report was not discussed due to lack of time, and the session was closed at 10:00 a.m. It should be noted that all the papers were published in the Congress Report (IUFRO 1906b).

Organizational matters

It was decided to hold the next Congress in Belgium, and for that reason, Belgian representative N.I. Crahay (1907-1910) was elected Chairman of the Union.

Resolutions

Decisions were made on each issue separately. No general resolution was adopted.

Excursions

In addition to the four sessions, excursions were offered. The booklet provided to the participants described the demonstrated experiment sites fairly well (IUFRO 1906c). In particular, apart from general information, including weather data, there were also stand characteristics/ measurements, species compositions of the stands, and information about thinning there.

In the Sunday morning of September 9, 1906, the delegates started off for a one-day excursion to the Oehringen and Heilbronn Forest Management Units, located at a distance of about 80 km from Stuttgart, to look at experimental plots of pure larch and mixed larch/spruce stands. In the evening, they returned to Stuttgart.

On September 10, 1906, participants took an afternoon excursion in suburbs of Stuttgart where they saw experimental stands of exotic tree species in Lustnau.

On September 11, 1906, participants took an excursion to the Oberndorf Forest Management Unit to experimental plots in spruce stands. Oberndorf was located at a distance of about 80 km from Stuttgart. In the evening, they returned to Stuttgart.

On September 12, 1906, participants took an afternoon excursion to the Schrezheim Forest Management Unit to see experimental plots in spruce stands, and then they moved to Ellwangen.

On Thursday, September 13, 1906, delegates went to an excursion to the Königsbronn Forest Management Unit where they could discuss the growth and status of beech and spruce stands within experiment sites. They spent the evening in Ravensburg.

The Friday afternoon of September 14, 1906, was dedicated to an excursion to the Baindt Forest Management Unit to experimental plots in spruce forests and mixed deciduous stands as well as plantings of introduced species. In the evening, they returned to Ravensburg.

On Saturday, September 15, 1906, the excursion was to the government district-level Weingarten Forest Management Unit and Wolfegg Prince-Owned Area where the attention of the participants was drawn to experimental plots in spruce and beech stands. In the evening, they returned to Ravensburg.

In the Sunday afternoon of September 16, 1906, the participants went on an excursion to the Weissenau and Tettnang Forest Districts. They visited experimental plots, which were designated for research related to the contents of ash elements in the wood of the alder, oak, mixed stands of spruce, fir, pine and beech. They then started to depart for their home countries from Ravensburg. Those who wished could stay for one more night in Ravensburg.

Russian participation

The Congress proceedings show that there were two participants from Russia: “Morosoff, Professor am Kaiserlichen Forstinstitut in St. Petersburg; and Winogradoff, Oberforster in St. Petersburg.” That is to say: 1) Morozov, Professor from the Imperial Forest Institute in St. Petersburg; and 2) Vinogradov, Senior (District) Forester from St. Petersburg (IUFRO 1906a, p. 2).

Professor G.F. Morozov participated in all the sessions of the Congress and reported about that Congress at a meeting of the Forest Society in St. Petersburg on October 7, 1906. (Морозов 1906b). In particular, he briefed the meeting on the history of the International Union and its Congresses. He noted that “the first Congresses had been primarily focused on research, related to forest statistics; later, much attention was paid to forest biology. Accordingly, the first Congresses had been characterized by similarity of demonstrated experiment sites-- for instance, all sites had numerous sample plots set aside for assessing the influence of late thinning and for preparing experimental tables. The two last Congresses had come to pay more attention to investigations related to natural history, such as the influence of forests on the climate, soil, and groundwater conditions. Alongside with sample plots, nurseries and other similar sites which had been in the focus of earlier Congresses, the agendas included issues related to zones, influence of the seed provenance on silvicultural properties of species, nomenclature of humic compounds” (Морозов 1906b, p. 1066-1067).

Apart from the identified strengths of the Congresses, he pointed to their weaknesses, including “the fewness of sessions, resulting in lack of time for presenting reports, to say nothing about the absence of the opportunity for debates and exchange of opinions: therefore, the best reports were presented in abbreviated versions with their further coverage through sharing opinions being scarce or non-existent at all” (*ibid.*, p. 1067).

Judging by the name, the second participant of the Stuttgart Congress, mentioned together with G.F. Morozov, could be only one person – Professor Pavel Zakharovich Vinogradov-Nikitin (1869-1938). His name was well-known among the Russian research community, but after the 1930s, it passed into oblivion.

P.Z. Vinogradov-Nikitin was a dendrologist and forester; he chaired the Russian Union of

Foresters, and taught in the Tiflis (Tbilisi) Forest Institute (Архивные справочники 2013). He graduated from the St. Petersburg Forest Institute in 1895 and was appointed to the Akhaltsikhe Forest Management Unit (in the Tiflis Province) to work as an Assistant Forester. He made a great contribution in the development of science and higher education in the South Caucasus and other areas of the Caucasus (Капанадзе 1990). The time spent in the Institute was described by P.Z. Vinogradov-Nikitin in his Notes about the teaching activities of N.A. Monteverde[70] in the Forest Institute in 1989-1894 (Виноградов-Никитин 1930). Later, P.Z. Vinogradov-Nikitin was transferred to work in the western region and became the first Forester of the Bryansk Experimental Forest Management Unit. Professor I.S. Melekhov noted that "several experimental forest management units, including the Bryansk Unit (1907) were established in the early 20th century; the Bryansk Forest Management Unit was designated to study the nature and economy of pine forests; it was the place where Professors P.Z. Vinogradov-Nikitin, V.P. Veselovskiy, A.V. Tyurin, V.P. Timofeev and others started their research work" (Мелехов 1957, p. 129).

Other authors also note that opening the first experimental forest management unit in the Bryansk Province was a very important development for forest experimentation in Russia, as it was the first experimental forest facility in the forest zone. The location was selected by a team which included, among others, Professor P.A. Zemyatchenskiy, who conducted soil and geological research there; local forest rangers Dombrovskiy and Koshkare; and P.Z. Vinogradov-Nikitin, first Director of the Experimental Forest Management Unit (Шошин и Решетников 2006, p.116).

Professor P.Z. Vinogradov-Nikitin was a Lifelong Member of the Russian Ethnographical Society. He was also a Member of the St. Petersburg and Caucasian Forest Societies, Permanent Member of the Caucasian Society of Agriculture, Corresponding Member of the St. Petersburg Academy of Sciences and Leningrad Botanical Garden, Correspondent of the Zoological Museum of the Academy of Sciences, Chairman of the Caucasian Society Geographic Society, Chairman of two Nation-Wide Russian Forest Congresses (in 1905 and 1907), Chairman of the first Regional Congress of Caucasian Foresters (in 1917) (Капанадзе 1990, p. 133). The 5th International Congress (Stuttgart, 1906) was held between the two Nation-Wide Russian Forest Congresses. As an outstanding scientist, teacher and leader, he was the best candidate for such a trip. Nevertheless, Professor P.Z. Vinogradov-Nikitin was not mentioned in any of the Session Minutes of the Stuttgart/Ravensburg Congress, or in G.F. Morozov's citations about the Congress at the meeting of the St. Petersburg Forest Society. For this reason, the question about his participation in the Congress remains open.

Interesting facts

At the Stuttgart Congress, the U.S. Forest Service (established in 1905) joined the International Union of Forest Experiment Stations. According to an article published in the U.S., the other member-countries of the Union were Germany, Austria, France, Italy, Russia and Switzerland – in other words, countries which were in the lead of forest research (Anon. 1906, p. 571). The accession of the U.S. to the Union was regarded as an evidence and recognition of the fast pace of forest science development in the U.S. However, for many years prior, the country had been contributing to the global progress of forestry primarily through inventions and applied research rather than through discoveries and science (*ibid.*, p. 572). Forest science and attempts to manage American forests on a scientific basis were associated with the opening of the New-York Forest College in 1898 under Cornell University, the pioneer of American forest education at the time.

The official recognition of the U.S.'s progress in forest experimentation was signified with

[70] Nikolay A. Monteverde (1856-1929), a botanist, Director of the Museum and Biological Laboratory of the St. Petersburg Botanical Garden, later, Corresponding Member of the USSR Academy of Sciences.

the invitation to join the Union. The invitation was sent by Dr. Bühler, Director of the Royal Württemberg Forest Experiment Laboratory in Tübingen, Germany.

In reply, the U.S. Forest Service assured the Union of its consistent and deep interest to the remarkable work of European Experiment Stations, which were such an important driver of forestry growth and development, from purely empirical experiments to genuine science. The internal forestry challenges of the country had mainly reflected local interests; therefore, the Forest Service's leadership had preferred to refrain from participation in research work of the International Union. However, by this time, a number of Forest Experiment Stations had been put in place, and it was now possible to offer forest areas managed by the Forest Service (127 million acres in total) for various studies which could be conductive to the development of forest science (Anon. 1906, p. 572). The Congress Minutes do not mention the name the U.S.'s representative (Walter Mulford), but he is found in the list of the Congress participants.

[Participants of the IUFRO Congress 1903 on the field trip. Professor G.F.Morozov is pictured, sixth from the left in a grey hat. Source: Österreichische Forst- und Jagdzeitung 1903, S. 321.]

Chapter 9
Congress VI – September 10-19, 1910, Spa and Brussels, Belgium

Information for this Chapter is primarily derived from the Proceedings of the 6th Congress of the International Union of Forest Experiment Stations, as published in the Printing House of F. van Buggenhout in 1911 (IUFRO 1910a). The meeting proceedings were also published in four issues of the 18th volume of the Belgian Forest Journal (IUFRO 1910b). In addition, this section draws from a detailed report provided by one of the Congress participants (Zederbauer 1910).

Overview

This was the first time a Congress was hosted by a country other than a founder country.

The 6th Congress was attended by 30 delegates from 15 countries of Europe and America: Austria, Belgium, Bulgaria, Denmark, Germany (Baden, Bavaria, Braunschweig, Württemberg, Hessen, Prussia, Saxony, Thuringia), Hungary, Japan, Russia, and Switzerland; new member countries were Holland, Portugal, Romania, Sweden, and the United States of America.

Delegates from Canada, France and Serbia could not attend the meeting. At the same time, 7 foreign guests were invited by Belgium to participate in the Congress. These guests were representatives from England, Holland, Luxemburg and Russia. The total number of participants was above 60 persons.

The Congress Committee of Honour consisted of its Co-Chairs (F. Sohollaert, Minister of Science and Arts, and G. Helleputte, Minister of Agriculture and Public Works); Deputy Chairs (Hoffmann, Director General of the Department of Water and Forest Management, and Baron Janssen, Chairman of the Executive Committee of the Brussels International Exhibition); and members (Admiral Max, Mayor of Brussels, Count A. Visart, Member of the Chamber of Representatives, Chairman of the Forest Council and Central Forest Society of Belgium). The Executive Committee consisted of its Chairman (N.I. Crahay, Senior Inspector of the Department of Water and Forest Resources), Deputy Chairman (L. Blondeau, Junior Inspector of the Department Water and Forest Resources); and Secretaries (Mr. Durieux and Mr. G. Crahay, both from the Department of Water and Forest Resources).

The agenda included 4 sessions, 18 presentations, 4 one-day tours, 2 afternoon excursions during the Congress, as well as additional excursions. The additional excursions were scheduled for September 20-21, 1910, for those who were to stay in Brussels on those days. At about 2:00 p.m. on Saturday, September 10, 1910, the Congress participants started to arrive in Spa. Upon arrival, each of them received a booklet containing the program for the Congress. The booklet included a detailed description of field demonstration sites, information about Belgium, its forests, and its forest trade, and numerous diagrams and tables (IUFRO 1910c). It also contained information about recreation in Spa.

At 8:00 p.m., a welcome reception started in the *Munich Tavern* and enabled the participants to introduce themselves and communicate with one another. The Congress was attended by Count Visart and other members of the Supreme Forest Council, Mr. Adolphe de Limburg-Stirum and Baron Gilles de Pelichy from the Chamber of Representatives, Mr. Hoffmann, Mr. Dierckx, Chief

of Staff of the Ministry of Interior, and many foresters and forest owners who were keen to learn about the silvicultural experiments and matters which had been put on the agenda.

Everybody was happy with the wonderful atmosphere of the meeting. All participants were polite and friendly, and they demonstrated sincere willingness to see, learn and share observations collected in other countries. Participants, especially foreigners, seemed to be very keen to visit Belgian forests and experiments sites. The agenda included the following topics (IUFRO 1910a):

1. Application of chemical fertilizers in forests (Crahay and Durieux);
2. Application of fertilizers in silviculture (Schwappach);
3. Assessment of nutrient sufficiency in the forest litter (Vater);
4. Standard plan of field experiments with chemical fertilizers in forestry (Verstaete);
5. Investigation of nitrogen absorption in forests (Julius Roth and Geza Zemplen);
6. Forestry research considerations (Van Schermbeek);
7. Transformation of pure spruce stands into mixed stands (A. Poskin);
8. Mixtures of deciduous species in beech forests (Quariere);
9. Role of the Scots pine seed provenance (Engler);
10. Pine needle cast disease and seed provenance (Mayr);
11. Summarized findings from pine provenance studies in Mariabrunn (Zederbauer);
12. Forest seed breeding issues (Crahay);
13. Importance of the black locust (*Robinia pseudoacacia*) for the forests in Hungary (Vadaš);
14. Forest humus generation (Bühler);
15. Report of the Committee on International Forest Bibliography (Bühler);
16. Annex to the Report in the French language (Flury);
17. Annex to the Report in the German language (Flury);
18. Annex to the Report in the English language (Flury);
19. Extract from the Report on Forest Bibliography, prepared by Forest Inspector Böhmerle;
20. Towards publishing an international journal of Forest Experiment Stations (Crahay);
21. Douglas fir (Visart and Bommer);
22. Detailed schedule of excursions and sessions (Organizing Committee);
23. Notes on Kampine flora (Delforge);
24. Notes on flora and fauna in Hertogenwald (Crahay).

Scientific program

The first session started on September 11, 1910, at 10:00 a.m. Mr. Crahay, Chief Inspector of the Department of Water and Forest Resources, Chairman of the Congress, opened the meeting. He welcomed the participants, extending special greetings to foreign colleagues who had faced the challenges and difficulties of the long journey to the meeting. He commended their interest in joining efforts and sharing their research results and experience (IUFRO 1910a, p. 7). He reminded participants that at the time of the 5th Congress (in Württemberg, in 1906), only 18 countries had been Members of the Union. Since that time, the Union had acquired 7 new member-countries: Canada, France, Holland, Portugal, Romania, Serbia and Sweden. IUFRO had turned into a truly international organization.

The Chairman said that three esteemed colleagues had passed away during the intervening years between this Congress and the previous one. He further noted that they had made significant contributions in the development of forestry and forest science. He spoke of Dr. Boppe, Director of the Forest School in Nancy, who had participated in the launch of the Union in Badenweiler on September 18, 1891; Dr. Ebermayer, Professor of the Munich University; and Forester Friedrich,

Director of the Mariabrunn Forest Experiment Station who had attended all the Congresses and had been Chairman of the Union. The meeting participants stood up to pay tribute to their memory.

Further on, he noted that it was a high honour for Belgium to host such an international forest event. Belgium, he noted, was focused primarily on industry, commerce and agriculture; forestry issues were therefore not a high priority for the government. Now, however, they had found their rightful place in the national agenda. He said that the forests played an important role in the country: Belgium had a population density of about 250 people per km^2 per capita wood purchase exceeded 26 francs (FR[71]) per year and the total national wood purchase amounted to about FR 200 million. The forest cover of the country was 18%, but a significant part of the forests was composed of low forest and overgrowth which failed to meet the minimum demand of industry for wood. The bulk of the forests consisted of coniferous plantations, younger than 60 years. Thus, it was not possible to demonstrate picturesque forests such as those which grew in Switzerland, Austria and Württemberg. Organizationally speaking, Belgian achievements in forest experimentation were not as significant as in the neighbouring countries because research activities took forest officers off their management-related job duties. On the other hand, some observations had been gained and Belgians could share them at the Congress. The Chairman gave his best wishes for successful work at the meeting, for the benefit of prosperity and improvement of "our precious forests" (*ibid.*, p. 9).

For a number of reasons, including the absence of Professor A. Bühler (who was not well) on that day, the agenda was modified.

First, the floor was given to Professor Vadaš who commented on a publication about the role of the black locust (*Robinia pseudoacacia*) plantations in Hungary. He concluded that such plantations had been established on a total area of several thousands of acres in mountains and on sandy soils. He reported that the plantations had stopped the soil flow, significantly improved the expressly continental climate, and protected people and cattle in the formerly bare steppe from the merciless sunshine. The tree species was an excellent nectariferous plant which aided the development of beekeeping.

The Chairman thanked the speaker and stressed that the locust could be as important in Belgium with its rather large areas, calling for improvement, and locust wood could be used for fuel. Mr. Antonesku (Romania) said that the locust did not grow in his country because of severe winters. Mr. Crahay (Belgium) noted that it was impossible to grow the locust in the Ardennes as its branches could not bear the heavy snow burden and trees suffered from frosts. Mineral fertilizers (phosphates), especially lime, significantly improved the growth of the locust. Mr. Zederbauer (Austria) shared Austrian experience(s), showing that the locust improved the soil.

This was confirmed by Mr. Schupfer (Bavaria) when he spoke about his country.

Then, Dr. Beck (Saxony) and Dr. Schwappach (Prussia) joined the discussion. Dr. Schwappach noted that his studies confirmed the results obtained in Central and Eastern Prussia. On soils of medium quality and in too mild climatic conditions, the locust growth had not been very successful, whereas on fertile soils, its growth was very good. On cutover areas with poor soils where pine forests had been growing, the locust was often the only species to be cultivated, because other forest plantations were susceptible to diseases. Under such conditions, the locust growth was poor during the first 3-4 years; but if the rust fungi were successfully controlled, the growth was very fast in subsequent years. Mr. Vadaš noted that there were differences in growth, but in some places, the locust tree grew very well after the pine whereas in other places, it was the heather which grew well in formerly pine forest areas while the locust would not grow at all.

Professor Engler (Switzerland) reported on an assessment of the influence of pine seed

[71] Belgium franc (BEF, FR) was equal to LMU Franc or 0,290322 g gold weight. LMU – Latin Monetary Union was formed by France, Belgium, Italy and Switzerland in 1865, and existed until World War One.

provenance, undertaken by a research station in Swiss forests; he demonstrated numerous diagrams and photographs in the process. The speaker regretted that Professor Mayr (from Munich) could not attend the meeting and discuss the matter, as their views differed in some respects. In particular, there were differences in opinions about seeds of *Pinus laponica*, growing in Northern Sweden at high and low altitudes. According to Professor Engler, the differences had arisen from the fact that pine trees from seeds of the most beautiful trees looked stunted and had irregular stems. Another difference was that seeds harvested at high altitudes were smaller and lighter than those harvested in flatland areas. This conclusion, too, differed from Mayr's findings. There were controversies about inheritance of certain traits.

During the discussion, Professor Schwappach reminded participants that the decision to conduct such studies had been adopted at the Congress in Tübingen. Pines had been planted in 1907 and 1908 in different countries from the Rhodopes in South-Eastern Europe to the polar region, and from l'Auvergne to the eastern border of Europe. The results were not sufficiently demonstrative as yet, because the plantations were too young and of different ages. That said, variations in height (from 0.4 m to 0.8 m) could be already seen. The best results had been achieved in Eastern Prussia in stands from seeds collected in Eberswalde, Potsdam, Pfalz, Belgium and Scotland; the worst ones were found in Perm and Southern France.

Mr. Opperman (Denmark) stressed the importance of such studies, especially for countries where that issue had not been yet addressed, as they could learn from experience of other countries.

Dr. Hesselmann (Sweden) stated that seed provenance had been under discussion in Sweden for a long time (for 15-20 years). Almost fifty years ago, they had started to import pine seeds from Germany. In some areas, the stands had grown enough to make some generalized conclusions, such as: "Young stands from such seeds have much longer sprouts of the current year than stands from Swedish seeds. As they had been growing, it was found out that the outcome did not match the expectations. Stems had irregular forms, and side sprouts were very big and robust. At the age of 30-40 years, mass-scale mortality was recorded. This means that pine seed imports, especially from Germany, led to significant losses for developed Swedish forests. The failure with the plantations was no doubt due to the fact that the seeds were not domestically harvested; domestically harvested seeds produce beautiful trees under similar conditions. Several months prior to the meeting, in order to avoid losses, the Swedish Government made the decision to treat the surface of imported pine seeds with eosin to distinguish foreign seeds" (1910a, p. 13). It was necessary to find out whether the failure with foreign seeds was due to the climate of the country or to the origin of defective seeds. "In Sweden, some are inclined to think that the seeds came from low-quality trees. The role of seed provenance is important for Sweden not only from the standpoint of foreign seeds, but also with respect to seeds, supplied from different regions of the country. In the uttermost north, pine fruition periods are very rare. Fruition with big cones may be expected only once every six or eight years. Even when cone are abundant, seeds may be poor. The question is how far in southern regions of Sweden, where pine fruition periods are much more frequent, seeds may be suitable for Northern Sweden; the Forest Experiment Station of Sweden has launched an extensive test to answer this question" (*ibid.*, p. 13-14). Professor Hesselmann then described the methodology of the testing.

Inspector Hauch (Denmark) described the results of experiments with acorns from various places. The Chairman read a letter from Professor Miguel del Campo from the Madrid School of Forestry who expressed his regret about the inability to attend the meeting, but had sent several copies of a booklet with a description of his studies related to Scots pine seed provenances.

Due to lack of time, the Chairman closed that interesting discussion with regret, and moved on to the next topic, which was the publishing of the international journal of Forest Experiment Stations. Professor Wimmenauer (Hessen) said that at the last Congress (in Tübingen), German

delegates had expressed the desire to publish an annual review of forest literature (Jahresbericht) as an Annex to the *Allgemeine Forst und Jagdzeitung*. The Editorial Office of the Journal could undertake this and the Journal should have an opportunity to cooperate with different countries.

The Chairman reminded the audience that it had been Professor Oppermann who had raised the publishing of the international journal for disseminating forestry experience at the 1906 meeting; and that he, as the leader of the Union, had had consultations with representatives from different partner organizations, disseminated a questionnaire (5 questions), and informed about the results of such a survey. Respondents had unanimously agreed that such a journal had been necessary. However, during the discussion, different opinions were expressed about the need to publish such a review, about the additional financial burden, and about its necessity, given the fact that small Stations could not print annual reports though they wanted to share their findings.

Nevertheless, the participants unanimously decided to have a Newsletter of the International Union of Forest Experiment Stations, which would be published on an annual basis in July-August. The Newsletter provide information about the work done by the Stations and the results they achieved. It was decided that the responsibility for publishing the Newsletter would rest with the Chairman's Office and the annual subscription fee would be increased to FR 30.

Then, Professor Henry (Nancy) announced that it would be possible to provide columns for the Forest Experiment Stations in the Annual Records of Agricultural Science[72], published in French. Printing and provision of 300-500 copies for the Union would cost a minimum amount of money to cover the expenses on paper, printing and delivery. The Chairman thanked Professor Henry and closed the morning session. After lunch, an excursion was arranged.

On September 13, 1910, the second session was opened at 09:00 a.m., 1910, the Palace of Congresses and Conferences in Brussels. It was led by Dr. Crahay, Chairman of the 6th Congress, who proposed to continue the discussion on the role of pine seed provenances. Wilhelm Zederbauer (Austria) presented the results of experiments in his country. He compared seeds from very old and young trees (20 years), and from vigorous and stunted trees, but he did not find any differences. E.g., in Galicia, he had assessed the resistance to the pine needle cast disease in stands from Swedish, French and Central European seeds. The highest resistance had been found in pines trees from Swedish seeding stock, which was likely due to their good growth in young age.

Professor Mayr from Bavaria argued that slenderness ("uprightness") of sprouts was closely related to injuries, caused with the pine needle cast disease., i.e. Ttrees, avoiding the infection, continued to grow straight. In northern regions (e.g., in Sweden), pines, affected with the pine needle cast disease were more resilient and rarely perished. As regards French and Hungarian pines, they were rather resilient if treated with the Bordeaux liquid. Mr. Siefert (from Baden) also found differences in growth rates of pines at different altitudes and the most striking differences were observed during the first 2-3 years. Mr. Engler deemed that the weight of seeds decreased as the height increased. Mr. Schwappach from Prussia did not agree with the conclusions made by Mr. Mayr. He said that it was not only the infection with pine needle cast disease which influenced the growth, but also the availability of a place for the fungus. He had observed the fungus on natural regeneration areas. Mr. Vater from Saxony argued that soil conditions, including the nitrogen level, might have significant influence on injuries caused by the disease.

Further, Mr. Fernow (USA) said that deeper insight into the matter was necessary. It was also necessary to conduct original studies for all species, taking into account the climate change. That issue was very important for the U.S., where the ranges of species covered several climatic zones.

Mr. Durieux (Belgium) noted that experiments did not yet enable researchers to address such issues as reforestation processes, development of young stands, resistance to diseases, as well as the

[72] Annales de la Science agronomique française et étrangère.

occurrence of pines in Russia (Riga, Perm), France, Bulgaria, Hungary under a parallel experiment in Campine and Groenendael. He reminded the assembled that the first results had been published in the Bulletin of the Central Forest Society of Belgium[73] in 1902.

Mr. Crahay (Belgium) shared his finding that young plants resisted the disease differently, depending on the seed provenances. Higher resistance had been found in plants from seeds imported from Scotland. More than 25 years ago, he had identified this disease in the Ardennes: it had been more prevalent in gullies with their higher air humidity. He supported the opinion that the Bordeaux liquid was a good remedy for prevention of the disease in nurseries. He also noted that it was very important to select the right concentration and ensure its timely application.

At the end of the discussion, Mr. Crahay suggested that the Congress should adopt the following resolution, based on the report on how to address issues of Forest Seed Breeding: (1) All Forest Experiment Stations are very keen to continue their studies, which are related to main tree species. These studies focus in particular on the qualitative properties of stands which can give good seeds, timing of seed harvesting, and seed production ages. as well as avoiding infected seeds during seed harvesting or treating the seeds to prevent their infestations with microbes or parasites; (2) To ensure progress in forestry, it would desirable to see institutional studies in different countries, focusing on: (a) a government body in charge of forest seed harvesting and preparation; (b) an institute for testing forest seed breeding laboratories; and (c) oversight and inspection of respective units of forest nurseries and seed driers. The proposal was adopted without comments.

After that, the Chairman opened the discussion on the second item of the agenda about the application of fertilisers in silviculture. Mr. Schwappach (Prussia) summarized the report as follows:

1. Application of fertilizers is of great economic importance for biodiversity of forest plantations because it enables successful forest renewal on non-cultivated land, and the use of community forests in an effective manner;
2. It is also advisable to apply fertilizers in forests with medium and best site conditions because it may accelerate forest regeneration or promote it on degraded soils as well as speed up humus accumulation;
3. In middle-aged and mature stands, fertilization does not benefit the stands, but can be supportive for good soil conditions;
4. The use of runoff waters and household waste waters of cities to fertilize tree stands deserves very serious attention in view of the economic significance of this issue;
5. The most important outcome of forest fertilization is the creation of small but sustainable stock of nitrogen at minimum costs;
6. It is possible to use methods of fertilization such as (a) application of fertilizers prior to establishing tree stands through seeding lupines and additional application of artificial manure or peat to increase the share of humic acids; (b) simultaneous use of the blue lupine or clover, and potato vine during afforestation, or combination of tree species, including the pitch pine (*Pinus rigida)* and mountain pine (*P. montana*), locust (*Robinia pseudoacacia*) and speckled alder (*Alnus incana*); (c) possible application of other organic fertilizers as well as ammonium sulphate and sodium nitrate;
7. Special attention should be paid to applying nitrogen fertilizers at the stage of active growth of tree stands.

Professor Vater (Tharandt, Saxony) had prepared a report about the adequacy of nutrient levels in the forest litter, based on studies in Tharandt which were published in 1905-1909. In view of the fact that growth could be impeded not only lack of one and excess of another nutrient or

[73] Bulletin de la Société centrale forestière.

element (lime, moisture, heat) in the soil, he proposed to modify Liebig's formula for the growing stock. He referred specifically to the following observation: soil fertility for a given station was constrained with the worst of its properties. Then, Professor Vater showed results of studies on selected chemical elements and compounds, and explained the study methodology. He distributed copies of his brochure with summarized findings among Members of the Union, and presented conclusions from the report.

In the afternoon, the participants took an excursion to the arboretum.

The third session was opened on September 15, 1910, at 02:00 p.m. in the Palace of Congresses. It was proposed to discuss the application of fertilizers in forestry. Speakers presented results and conclusions from field experiments in Belgium.

Then, Mr. Van Dissel (the Netherlands) told the audience about fertilization in forest plantations. In the Netherlands, there were about 600,000 ha non-cultivated land. Around 1/20 of it was owned by the government, 3/20 owned by municipalities, and the remaining 16/20 in private ownership. The area was intensively cleared at a rate of about 5,000 ha/year. The best areas of the land were converted into arable fields and grazing grounds. Forestry was often limited to residual poor soils – primarily, dunes and shifting sands as well as heathland. As in Belgium, fertilization was a very important issue for the Netherlands. Mr. Van Dissel then told the audience about the scales and methods of fertilization; he dwelled on the role of mycorrhiza development on plant roots in the application of fertilizers and at control.

Mr. Verstraeten, Director of the Belgian Engineering Station of Fertilizers in Brussels, gave a brief account of his observations and presented a standard plan of field experiments with the use of chemical fertilizers in silviculture. The plan was presented in the form of two tables: the first one depicted the use of fertilizers in the period of active mass accumulation, while the other one showed it in orchards and nurseries.

According to Mr. Schönberg (Russia), Russia had little experience in applying fertilizers to improve the chemistry of the soil. Speaking about the importance of fertilization for trees, he noted that forestry was too ambitious in desiring to apply intensive agricultural methods. He referred to Russian moraines (nutrient-poor sands) where various pine forests grew on soils which contained mineral elements in equivalent amounts. He emphasized the importance of considering physical properties of the soil as well (IUFRO 1910b, p. 34).

Chairman Crahay noted that physical properties of soils certainly played an important role, but that issue was not on the agenda and required special prior consideration. He proposed to include it in the agenda for the 7th Congress (The proposal was unanimously adopted).

Mr. Schwappach said that the plan proposed by Mr. Verstraeten was more suitable for crop production because it was very difficult for forestry to find a significant number of plots where the conditions remained unchanged. Forestry was unlikely to be able to work with nitrogen fertilizers which were rather expensive and easily washed out; thus, it would be waste of time and money for repeated experiments. Referring to Mr. Schönberg's report, A. Schwappach said that there was a biochemical effect.

Mr. Hesselmann (Sweden) noted that in natural forests, the soil chemistry played a less important role than the physical properties of the soil. He fully shared the opinion expressed by Professor Schönberg. Most often, the importance of artificial fertilization consisted in the physical changes induced by fertilisers. His observations in Swedish natural forests confirmed the need to undertake detailed investigations in areas such as soil biology, biological and chemical processes, in order to identify and prove a more precise relationship between the growth of forests and soil properties, rather than relying only on chemical soil tests, which may also yield erroneous results.

He noted that purely chemical soil tests were made by agricultural chemists, and they did not cover forest soils, of course.

Later, Mr. Vater, Mr. Engler and Mr. Julius Roth (from Hungary) joined the discussion.

The next report (about the influence of forests on the aquifer) was delivered by Professor Morosoff/Morozov (Russia). He referred to the work done in Russia by Mr. Ototzky. The speaker had started his investigations in the *Shipov Les* forests in 1901. A well had been dug and reinforced with wooden walls within each of two identical 1-ha plots. They had been located in a natural oak forest, aged 194 years, growing in sands presumably of the tertiary sub-period, covered with tertiary green clay, on cretaceous bedrock (IUFRO 1910b, p. 37). From the very beginning, the water levels had been monitored. In April and May 1903, trees had been cut out in one of the plots, and until the year 1906, there had been no substantial difference in the water levels between the two plots. In 1906, the aquifer curve of the cutover plot had started to go up; at first the difference was very insignificant, but eventually it had reached 61 cm.

Mr. Schwappach emphasized that it was not easy to achieve such results as obtained by Professor Morozov, and confirm the adverse impact of forest cutting. For example: in Vienna, the forest would not have such impact on underground waters. He noted that it was important to differentiate between water flows in passive and surface layers; it would therefore be necessary to clarify this difference before making a conclusion. Mr. Morozov pointed out that the water in the *Shipov Les* forests was passive and that it was the forest which was the main cause of the differences.

Mr. Hesselmann (Sweden) noted that Professor Morozov's interesting lecture enabled him to make some comments; after all, forest influence on ground waters was of great importance for forest cultivation in Sweden as well. Indeed, that issue had much in common with the issue of forest invasion, especially over moorland areas. In Northern Sweden, moorland stretched over very vast areas. Some sources argued that that issue could be addressed through deforestation, i.e., transformation of the surface layer of the forest litter while others argued that swamps proliferated as a result of forest clearcutting. He gave the example of a study to assess interrelations between a deciduous forest and water in a district in Sweden, telling the audience that the Swedish Forest Service undertook an experiment in Northern Sweden within two vast plots (4 ha and 6 ha). To measure the ground water levels, 20 wells had been drilled in each of the plots, and the water level was measured in each of the wells. The speaker supposed that results of that experiment could be similar to those obtained by Professor Morozov, and that such changes could occur in future.

On September 18, 1910, the fourth session, chaired by Mr. Crahay, was held in the same place. The first item of the agenda was to discuss the report, made by Dr. Bühler (Württemberg), who was the Chairman of the Committee on Forest Bibliography. To follow up the discussion, Professor Böhmerle acquainted the participants with the proposals adopted by the Committee at its meeting on July 18-19, 1910. The list of proposed novelties included a new structure of the review; publishing of an annual catalogue of publications since 1911; preparation of a retrospective collection of studies, published during the period of 1700-1910; financial guarantees of subscription; collaboration with the *Concilium Bibliographicum* from Zurich; and use of languages for the originals and for abstracts[74]. It must be noted that the proposed novelties included the use of decimal numeration of chapters to make it possible to complement publications with material which might emerge later.

During the discussion, the floor was given to Bech and Vater (both from Saxony); Böhmerle as well as Siefert (from Baden) who thanked the Committee for the work done and agreed with Mr. Bech who had said that the work should be launched as soon as possible; and Flury (Switzerland)

[74] It was proposed to use the German, French, Italian, English and Latin languages in various combinations.

who underlined that card catalogues were rather practical though Oppermann (Denmark) noted that it was not necessary for specialists from different countries to cooperate in order to make card catalogues.

Mr. Engler (Switzerland) thanked the meeting for the honor of their request that Switzerland organize the work to produce an international bibliography, but he thought that his country alone would not be able to assume that challenging endeavour. In addition, it was necessary to receive confirmation of expenditures from the Federal Council because Switzerland would have to collect Swiss Francs (CHF)[75] 60,000-70,000 to complete the assignment. For that reason, the work could be commenced no earlier than in 1912.

Mr. Böhmerle (Austria) said that the work should be undertaken by Switzerland, as Switzerland was the best prepared country for such work. He proposed to decide against abolishment of the Committee and to include Mr. Bech in its composition. The attendees agreed. The Chairman summarized the discussion and proposed to adopt the following resolution: "Switzerland is asked to undertake to publish the forest bibliography and convey this request to the Government of Switzerland on behalf of the International Union through the diplomatic channels"[76].

If Switzerland refused to undertake that work, it would be necessary to ask Belgium to do it, though the Chairman was not sure that Belgium had capacity and equipment for such work. Details such as whether it was worthwhile to use a card catalogue or another type of publication should be addressed by the organizing country – the vote for this measure was unanimous.

Mr. Bommel, Supervisor of the Botanical Garden in Brussels, provided the participants with his brochure about introduced plant species in Belgium.

In addition, the Chairman thanked the Government of Japan for the beautiful book about forestry in Japan which had been given to the Congress participants, and presented by Mr. Shirasawa.

The Chairman proposed to publish the report, titled: *A Forest Humus Generation Study*, prepared on the basis of the humus display (Stuttgart, 1906) by Professor Bühler, and funded out of proceeds of the International Union. To address details, he proposed to set up a committee, consisting of Bühler, Crahay, Engler, Schwappach and Vadaš. This proposal was adopted.

In the absence of Mr. Poskin, it was Mr. Durieux who reported about transformation of pure spruce stands into mixed stands, the speaker proposed to summarize the report as follows:

"1. It is important to avoid, as appropriate, clear cutting practices in spruce forests with their subsequent artificial reforestation;

2. To refrain from cultivating pure spruce stands during reforestation. If it is necessary to continue to grow spruce, to integrate other species, including the beech and fir, in the species composition;

3. In pure spruce stands, artificial reforestation under the canopy is a good way to mix spruce with other species;

4. It is desirable to undertake a thorough investigation to identify a method which would be the most suitable in different situations".

In view of the importance of the matter, the Chairman proposed to include it in the agenda of the next Congress. (Adopted)

In the absence of the speaker (Quariere), the Chairman read the conclusions, provided by the author of the report about mixtures of deciduous species in beech forests. Recognizing that beech forests were of high value and available knowledge about the growth in mixed forests was

[75] One CHF was equal to 0.290322 g gold weight (LMU franc).
[76] It was done so.

insufficient, it was proposed to organize systematic experiments to define: (a) approximate shares of other species in beech stands; (b) minimum shares of other species with due regard to the age of surrounding trees and their light admission needs; (c) rotation ages of the plants with a focus on the best outcome.

Dr. Schwappach proposed to have the personal conclusions of the author recorded in the Minutes, but without referring to the Union (Adopted). During the discussion, the floor was given to Mr. Kotiba, retired Water and Forest Inspector (Belgium), and Mr. Engler translated his words into German. Upon consultation with the meeting participants, Chairman Crahay said that all the recommendations were regarded as the personal opinion of the author, who was not an official delegate from a Forest Experiment Station. Therefore, it was not possible to attribute them to the Union. This disclaimer was included in the Minutes.

Professor Hesselmann (Sweden) proposed to adopt the following resolution: "The International Union of Forest Experiment Stations deems it desirable that if Stations do not publish their reports in English, French or German, they should provide summaries of such reports in one of the above three languages and translate all the tables, boxes or figures in one of these languages in the text of the reports". (Adopted)

The next report was delivered by Professor Van Schermbeek (Wageningen, Holland), who spoke about the important role of water for tree growth and illustrated his report with numerous diagrams and pictures. In his experiments, he strove to define the rules governing the growth of trees.

Mr. Bommer told about the Douglas fir in Belgium, pointing out that the studies had been conducted in the severe climate of the Ardennes at an altitude of about 510 m a.s.l.

Organizational matters

The new Chairman of the Union – Hungary's representative Jeno Vadaš (1911-1914) – was elected.

Decision on the venue for the next meeting: On behalf of the Hungarian Government, Mr. Vadaš declared that he was honoured to invite the International Union of Forest Experiment Stations to hold the next Congress in Hungary in 1914.

Mr. Schwappach said that Prussia and Bavaria were also ready to host the Congress. Having taken note of the kind invitation extended by Hungary, he said that both Mr. Mayr and himself welcomed the invitation of their colleague Vadaš because they were keen to learn about developments abroad.

The Chairman thanked Prussia and Bavaria and proposed to accept the invitation from Hungary; the proposal was unanimously adopted. He also thanked the audience for the work and said that he was looking forward to seeing them all in four years in Hungary. (The words were greeted with applause)

Mr. Schwappach thanked the Chairman for the efforts to prepare and hold the Congress and suggested that all should stand up to express gratitude. The session was closed at 12:30.

In the evening of September 19, 1910 (Monday), the Belgian Government hosted a banquet during which the delegates and Members of the Congress Committee of Honour and Executive Committee met in the halls where the Brussels Exhibition was displayed. The 6th Congress of the International Union of Forest Experiment Stations completed its work (Zederbauer 1910).

Resolutions

The Congress did not adopt any resolution; there were only records in the Minutes.

Excursions

The demonstration sites were described in the brochure, which also included a map of the Belgian Provinces. Some of these Provinces would be visited during the Congress.

On September 11, 1910, the visit to Spa to see the famous mineral water fountains was scheduled for the afternoon. The delegates were delighted with the classical excursion, called *Fountains Tour*.

On Monday, September 12, 1910, the designation of the one-day excursion was Hautes-Fagnes and Hertogenwald.

The excursion participants departed from Spa at 7:30 a.m. On that day, they visited experiment sites meant for monitoring swamp formation and application of fertilizers; they saw sanitary cutting sites, forest planting practices, forest plots infected with a conidial fungus (*Septoria parasitica)*, and experiments with spruce cultivation. After lunch, they went to cultivation sites of the Scots pine, red spruce (*Picea rubra*) and pitch pine (*Pinus rigida);* and admired the picturesque sights, including the dams and Gileppe Lake. At night, they took a fast train to return to Brussels.

On Tuesday, September 13, 1910, participants took an afternoon excursion to the Arboretum and Experimental Forest Nursery in Groenendael.

On Wednesday, September 14, 1910, participants took a one-day tour to Campine. They departed from Brussels at 6:51 a.m. for the northern part of the country. During the trip, they visited sites where stumps were uprooted; sites of experiments that involved the use of city waste waters in the form of silty mud, lupine seeding, fertilizer application; stands of pine of various provenances; and mixed stands of pine. After lunch, they went to dunes and then returned to Brussels by train.

On Friday, September 16, 1910, participants took an excursion to St.-Hubert and the forests of St.-Michel. In the morning, they went to St.-Hubert by train, and then crossed the Freyr community forest by car. In the Forèt Pays de Lucy Forest, they were acquainted with experiments to establish under-canopy plantations in pure spruce forests, to plant spruce, and to thin spruce stands. After lunch in St.-Michel, they visited mixed beech, maple and oak stands. In the evening, they returned to Brussels.

On Saturday, September 17, 1910, participants took a one-day tour to the forest, called 'Forêt de Soignes'. They departed by car at 7:30 a.m. for Porte de Namur. They saw alleys of the Chilean pine (*Araucaria imbricata*), located in the Avenue Louise, not far from Bois de la Cambre. It is noteworthy that those trees, aged 35 years, had survived several cold winters. In St.-Hubert, the participants saw beech forests, aged 148 years. After lunch, they visited areas where various tree species were mixed, high-value species were transplanted; they also saw how harrows were operated, and how lime was applied. Then they returned to Brussels.

Additional excursions were organized on Sunday, September 18, 1910 (in the afternoon), and on Monday, September 19, 1910 (in the morning) to Tervueren and Groenendael to visit the Arboretum of Leopold II and Forêt de Soignes.

According to the program, additional excursions could be arranged on September 20 and September 21, 1910, for those who stayed in Brussels on those days (IUFRO 1910c).

Russian participation

G.F. Morozov, Professor from the St. Petersburg Imperial Forest Institute, delivered a report, and Valter G. Schönberg (1876-1914), Assistant Professor from the Novo-Alexandria Forest Institute, spoke during the discussion about the humus generation. Unfortunately, there is not much information about the life and work of V.G. Schönberg in the Russian literature. One of the few sources is the obituary notice, written by G.F. Morozov, presented below unabridged:

"To the memory of V.G. Schönberg.

On February 8, 1914, Valter G. Schönberg, an outstanding forester and scientist, was killed with a cannonball in the battle under the town of Drobin. He was buried in the place of his death, in an unmarked grave. Such was the brief information, conveyed to his relatives by comrades of the diseased.

Valter G. Schönberg was born on December 27, 1876 in Warsaw, in the family of a teacher in the Warsaw Grammar School and in the Warsaw University (where he taught German). In 1897, he finished a Grammar school, started to study at the Department of Natural Sciences of the Warsaw University, and graduated from it in 1901 as a specialist in botany. In the same year, he started to study at the Forest Department of the Novo-Alexandria Institute and graduated from it in 1903. Upon completion of his compulsory military service, and passing of the exam to become a warrant officer, he was mobilized to wartime military service during the Russian-Japanese War. In 1905, he passed the exam to become a teacher of the German language, taught it in the Novo-Alexandria Institute, and, at the same time was an assistant to the Professor, responsible for forest experimentation at the Ruda Forest Allotment and in nearby forest management units. He stayed in Alexandria till 1911, and during that period, he was once seconded abroad for a year or so. His attention was focused on France, in particular, on the Vosges; together with him, we visited Belgium, and then, he worked in Eberswalde, relying on the resources of Professor Albred's laboratory to investigate soil conditions in the training forest management units of that Academy. His study was published also in German in the Journal of the Academy and in the Forest Journal.

In Alexandria, he produced such excellent studies as a typological description of forests in the Kielce/Sandomierz Mountain Range which was published in the Forest Experimentation Proceedings for the year 1908 in the 14th issue.

In addition, he prepared a preliminary description of mixed forest types in the Radom Province, which was published in a very lively, but unfortunately already non-existent journal, called *Zametki lesnichikh Radomskogo Okruga* (Notes of Foresters from the Radom District).

Part of his diploma study was published in *Lesnoy Zhurnal* (Forest Journal) in 1904, in an article under the title: *Regeneration of fir stands in the Borzetinskohye Forest Management Unit.*

The same journal published his soil studies, based on his work in the Ruda Forest Allotment, including a soil map as well as results of his regeneration observations in the Vosges forests.

His very good education for silvicultural research included a preliminary university course, followed with graduation from the Forest Department of the Novo-Alexandria Institute where alongside with core subjects, he studied soil science under the supervision of such an outstanding scientist as Professor K.D. Glinka; he possessed various skills and capabilities, perseverance, observation skills and excellent knowledge of foreign languages – so he was fully prepared for fruitful research work.

He moved cautiously, avoiding premature generalizations in the area of silviculture, striving first to provide unbiased premises for his forest research. For example, V.G. was very keen to study natural regeneration, in particular, after group selection cutting (with its good practices seen by him abroad), and here, excellent fir shelterwood regeneration cases were observed; for someone else, such observations would have been sufficient to form a one-sided notion of benefits from such cutting practices everywhere. It was so lucrative, so attractive. But his intuition and cautiousness prevailed, and he clearly saw the multifaceted manifestations and complexity in the Nature, as well as the impossibility to confine to several patterns and the necessity of provisional investigation of each issue on a biogeographical basis. In the recent years, he worked as assistant (since 1911) to Professor Ponset de Sandon, and was in charge of the Petergof Forest Allotment under the Riga Polytechnic School, and together Professor Ponset de Sandon (who has also passed away), they

embarked on the reorganization of the Forest Allotment. V.G. started from analysing the soil conditions and produced a soil map of the Allotment, and together with V.B., they divided it into stand types.

Certainly, this brief obituary notice is not a proper place for a detailed review of his scientific work. His studies were so strikingly bright that they cannot and will not vanish without an important imprint because they are a high-value contribution in our modest scientific silvicultural literature.

The death of V.G. is an open wound both for those who knew him well and for those who take to heart and appreciate the significance of research in Russian forests.

A stray shot took away the life, full of inner emotions and expectations.

The heart is aching, and the feeling of frustration prevails...

G. Morozov" (Морозов 1915, p. 1403-5)

Interesting facts

In the same year, Brussels hosted the International Exhibition. It was not only distinguished by its large area, but it was also marked by a terrible fire which inflicted enormous losses, including reputational ones. For Russia, it was memorable also because the Exhibition was rewarded for its promotion of achievements in science, technology and arts. The award was received by the Ligovka People's House – located in the 63rd building in the Tambov Street in St. Petersburg where the Railway Workers' Recreation Centre is located now. The building had been designed by famous architect Jules-Louis-Auguste Benois, and erected in 1902, with funding and stewardship provided by Countess Sofia V. Panina, a well-known public figure of the early 20th century; now, the building is a federal monument of architecture.

In the same year, Brussels hosted the First International Congress of Entomologists. It is not known whether it was attended by forest entomologists or not, but it is well known that the Second Congress (Oxford, August 4-9, 1912) was attended by Professor Mikhail N. Rimskiy-Korsakov (1873-1951) (Proceedings 1912, p. 166, p. 176); at that time, he was the Head of Zoology Chair at the St. Petersburg University, and later, he held the Chair of Zoology and Forest Entomology at the St. Petersburg Forest Institute.

International issues of forestry were discussed at the International Congress of Foresters in Paris on June 16-20, 1913, under the auspice of the Tourism Club of France (Touring-Club de France) and under the chairmanship of its Vice-President Henry Defert (Congrès Forestier International 1913). The only foreign member of the Committee of Honour was Gifford Pinchot, Chief of the U.S. Forest Service, who had French ancestors.

That Congress brought together entomologists from 26 countries, including Russia, represented by Eduard E. Kern (1855-1938). Kern was Councillor of State, Deputy Inspector of the Foresters' Corps, and Member of the Council of the Ministry of Agriculture and State Property (in 1905-1915 – Main Directorate of Land Use and Agriculture of the Russian Empire). The Congress was also attended by other people, well-known in the forest community, including: J. Vadaš, Chairman of the Union (since 1911 till 1914) in his capacity of the Councillor to the Minister, Director of Forest Experiment Stations of Hungary; J. Roth, Forest Inspector, future IUFRO President (since 1933 till 1936); Mr. Dubois, Forest Inspector from Belgium and others.

Chapter 10
Congress Cancelled – September 7-17, 1914, Budapest, Hungary

According to the 7-line announcement, the 7th Congress of the International Union of Forest Experiment Stations was to take place in Budapest, Hungary, on September 7-17, 1914. The organizers planned excursions to the following areas: Palics Kirälyhalom, Horgosi-Kiralyhalom, Szeged, Temösvar, Karasjeszenö, Vadäszerdoö, Gödöllö, Garamberzence, Selmeczbänya, Besztercebänya, Fenyöhäza, Likava, Csorba-tó и Tätralomnic[77] (Forestry Quarterly 1914a, p. 301).

The Congress was fully prepared, but it was not held due to the outbreak of World War One, which started 40 days before the opening of the Congress. Even the venue of the Congress in Selmeczbanya[78] "fell victim to the war" (Fekete, Roth 1928, p. 405).

Information products for the Congress included already printed Hungarian and German versions of a deluxe edition of "the recently completed forest geographical review of main forest trees and shrubs in Hungary", prepared by Professors Lajos Fekete and Tibor Blattny (IUFRO 1936a, p. 3).

Years later, Professor A.V. Tyurin wrote: "the Hungarian Government and Forest Experiment Station were fully prepared to host the Congress, but the war, broken in July 1914, made it impossible to convene the Congress in Hungary and even posed a threat for the very existence of the international research alliance. Then, the war ended. In the flames of its fires, some states ceased to exist, while others emerged. Over time, the war horrors were forgotten, and the need to have international research and cultural alliances arose again. Again, the idea to unite efforts of forest experiment stations was revived at the international level, and there arose an initiative to convene the 7th Congress which had not been held in 1914 in Hungary" (Тюрин 1929a, p. 96), but it was accomplished only in 1929.

Later, Professor Flury would return to the events of those times. In his article for the Bibliography Committee, he noted that by the autumn of the year 1914, preparatory activities had been competed, but the war had killed the fruit of those efforts, and the money, collected for that Congress in 1911, some 19,587 German Marks (*Deutsche Mark* = DM) had been dissolved by the inflation in Germany (Flury 1936).

It was a huge amount of money; and to show it, it would be worthwhile to refer to some data, showing the value of the DM in that time. Since the emergence of the German Empire in 1871, the price of one DM in German paper currency was equivalent to 0.358423 g gold weight. In 1910, before the World War One, one DM was equivalent to 46 Russian kopecks (100 kopecks = 1 RUR). Conversely, one Russian Rouble was equivalent to DM 2.16 (RUR = 0.774235 g gold weight).

In Russia, for comparison: a 400-gram loaf of fresh rye bread was bought for 4 kopecks, the cost of 1 litre of fresh milk was 14 kopecks, the cost of 1 kg of frozen humpback salmon or 1 kg of

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[77] In the western direction: Subotica/ *Szabadka*, Horgos, Szeged, Gödöllő, Miskolc (Csorba-tó Lake) and other places as well as to forest plots around settlements which do not exist now or which became streets in today's Budapest.

[78] ... or Schemnitz (German) is a city in Czechoslovakia which was part of the Austro-Hungarian Empire; now, it is Banská Štiavnica, a city in Slovakia.

refined lump sugar was 60 kopecks, and that of fresh chicken or frozen salmon or pressed black caviar of the 3rd grade was 80 kopecks. The price of summer shoes was RUR 2, that of high cow leather boots was RUR 5, and a business suit for a clerk was bought for RUR 8. The average monthly salary of an unskilled worker was RUR 20-35 while a highly skilled workers earned RUR 75-120 per month (Ширкогоров 2013).

From this viewpoint, it is interesting to look at the salaries of Russian foresters, published in the *Austrian Forest and Game Newspaper* in 1903 (Die Gewaltverhältnisse 1903, p. 498). In particular, according to available data, as of June 12, 1902, the monthly salaries of government officials (depending on the category of the province and rank of the official) amounted to (in Silver Roubles):

Position	Category I	Category II	Category III
Chief Forester	6,000	5,000	4,500
Assistant to Chief Forester	3,300	3,000	2,800
Official for Special Errands	2,500	2,200	2,000
Forwarding Agent	1,400	1,300	1,200
Land surveyor	1,000	900	800

In the late 19th and early 20th century, the ratio between the market values of gold and silver was 1:35, which means that the monthly salaries of forest officials in Gold Roubles amounted to:

Position	Category I	Category II	Category III
Chief Forester	171	143	129
Assistant to Chief Forester	94	86	80
Official for Special Errands	71	63	57
Forwarding Agent	40	37	34
Land surveyor	29	26	23

In addition to the salaries, officials were provided with allowances for meals and rent of housing unless they had their own housing.

So, the almost DM 20,000 which was collected in 1911, was equivalent to over RUR 9,000. In other words, it was a rather big amount of money.

In December 1914, the *Forest Quarterly* Journal published a new four-page comment about the war. In particular, it read: “The great war, as everybody by this time must have realized, extends its blighting influences to the remotest corners of the earth and into the smallest concern of the single individual, of combatant and neutral nations alike. Even the Forestry Quarterly is no exception, for an important part of its raw material, the European forestry literature, is to a large extent, cut off. The German and Austrian magazines have ceased to arrive since August, and it is probable that they have ceased to be issued. We still receive, albeit belated, Swiss and Scandinavian publications, but the French have been discontinued or have at least not reached us… At this juncture we are naturally inclined to speculate as to what the influence of the war on forest administrations may be” (Forestry Quarterly 1914b, p. 656). Therefore, the authors assumed that most likely “the fine machinery of forest administrations will probably be very considerably damaged through the disturbance of its administrative personnel and woods labour” (*ibid.*, p.658).

As often happens, the death of a familiar person is a greater shock than that of several strangers. The note mentioned that renowned German forester “Oberforstmeister Fricke, Director of

the Forest Academy of Munden[79], fell in battle; we can assume that the majority of administrative officers will have also taken the field. Indeed, such is the conception of duty to defend the fatherland that probably the whole service is dismantled and left in the hands of those Oberforster and Forster whose age prevents their joining the army. The universities are closed, and there is little doubt, the forest schools are in the same condition" (*ibid.*, p. 658). Of course, during the war, noone took care of experimental forests or sample plots. However, on the eastern front, "especially on the Russian frontier, where extensive areas of coniferous forest are located, the loss by fire will undoubtedly be heavy, and it will require a long time to bring back the equilibrium of age classes, which it has taken a century to establish. The same causes of forest destruction which have been active in France and Belgium may repeat themselves on German soil" (*ibid.*, p. 659).

What was going on in that time in Russia, on the other side of the terrible war? "Graduates from the Forest Institute were conscripted and sent to the front line as junior officers. Many of them were students of Professor G.F. Morozov, and hence, advocates of scientifically motivated forest practices. The *Lesnoy Zhurnal* (Forest Journal) informed its readers about the war deaths of V.G. Schönberg, S.S. Gruzov, A.A. Bekreev, V.I Dillo, A.M. Sergin, S.N. Klimov, I.A. Kublitskiy, N.K. Levalt-Ezerskiy, N.I. Danilov, N.V. Bryl, V.E. Zvonogrodskiy, V.I. Zhuravlev, V.I. Nikilaevskiy, A.N. Gurtyev"(Федотова 2007,p. 370).Only in one issue of the Journal for 1915,G.F. Morozov wrote four notices of the deaths of his students and colleagues who had perished in the war (Морозов 1915).

In addition, "the schedule of expeditions and stationary studies was disrupted, financing for many of them was cut down … Expeditions to Russia's 'colonization' areas were not completed (with the largest of them being expeditions of the Resettlement Directorate), obtained data were left without proper processing. Most of them were published only as 'draft reports' and 'expedition proceedings'. For instance, V.V. Sapozhnikov who was taking an expedition to the Semirechye Oblast (Zhetysu), intended to write a big book about vegetation of the area, but the work at the book progressed very slowly in the war years. In 1922, the unfinished book perished in a fire, along with the prepared data.

World War One had its imprint on scientists and their work, but was not as detrimental as the consequential collapse of the Empire. In spite of all hardships, the botanical and geographical activities were not frozen in those years. The list of papers, articles and major peer reviews in the area of Russian plant geography for 1915-1917, prepared by N.A. Bush, includes 391 items; and it is unlikely to be exhaustive. In areas which were not affected with war actions, rather active work was underway. For example, in 1916, per the request of the Division of Land Improvements of the Ministry of Agriculture, R.I. Abolin, V.S. Titov, V.F. Moldengauer and V.N. Sukachev conducted both expedition-based and stationary soil and botanical studies in the Semirechye Oblast (Zhetysu). The establishment of the Batumi Botanical Garden was ongoing in a proactive manner (Федотова 2007, p. 370-371).

* * *

So, at the first stage of IUFRO's work, it proved to be a full-fledged organization with very successful achievement of its goals. The initial Central European nucleus of the Union was eventually developing into a global organization, with representatives from Asia and North America joining it as members. Meetings became increasingly more regular, research methods were presented and coordinated, results were shared and discussed, and decisions were adopted.

A special focus of the first Congresses was on practical demonstration of experiment sites

[79] A participant of the IUFRO constituent meeting in Eberswalde in 1892.

during excursions, and it was directly evidenced by G.F. Morozov who participated in most of the pre-war Congresses (Морозов 1901). Excursions helped representatives from different countries to learn about the methods and location schemes of experimental plots, thinning methods, and wood-working technology. Therefore, discussions of subsequent Congresses centred on such issues as standardization of methodologies, unified terminology and common forest bibliography. A noteworthy example of successful cooperation is the provenance identification of the twelve pine varieties which were simultaneously planted in experiment sites. Admittedly, the decisions taken at these meetings were often of little practical use, as there was no executive body able to have the regulating and coordinating influence between Congresses (Speer 1972). M.M. Orlov pointed this out, saying: "To implement these presumptions, the Union should set up a standing committee, representing the Union, i.e., a so called permanent office of the Union, following the example of the International Institute of Agriculture in Rome" (Орлов 1915, p. 196).

In this context, a closer look at the International Institute of Agriculture (IIA) is needed. In the late 20th century, David Lubin (1849-1919), USA citizen of the Russian descent, was captivated by the idea to establish an International Chamber of Agriculture to provide comprehensive and systematic assistance to farmers. He "believed that lack of cooperation by the various nations in agricultural activity was a hardship to the farmer" (Marcosson 1906, p. 8021). The idea was interesting, and in 1904, King of Italy Victor Emmanuel III made available in Rome "a palace to be used as a permanent home is now being built and will be ready early in 1907" (*ibid.*, p. 8022).

Several meetings were held in Rome from May 29 to June 6, 1905. They ended at the International Agricultural Conference, which was convened at the initiative of the King of Italy, on June 7, 1905 when an international treaty was signed to establish the International Institute of Agriculture (the IIA). The IIA would be "a government institution, in which each adhering power shall be represented by delegate of its choice" (IIA 1913, p. 4). The IIA was steered by its General Assembly and Permanent Committee. At the date of its establishment, the Institute was staffed with 97 persons, including its President, Vice-President and General Secretary, and consisted of several units, including the Bureau of General Statistics. Forty countries ratified the Treaty. The annual funding of the IIA was set at about FR 1.15 million. Some 25% of that amount or FR 300,000 (~US$ 60,000) would be provided by the King of Italy – the rest of the amount was to come from contributions of member countries (IIA 1913).

The Institute was designated to provide systematic assistance to farmers in the dissemination of agricultural knowledge, collection of statistics, borrowing, and pricing monitoring in agricultural markets.

"Every nation that took part in the Congress will contribute to its support and have a permanent representative there. President Roosevelt very properly appointed Mr. Lubin as the first American representative" (Marcosson 1906, p. 8022). Mr. Lubin took his position officially in 1906 (Agresti 1922). From the very beginning, Russia took an active part in the IIA establishment. In that process, Russia was represented by A.S. Ermolov (1847-1917), Minister of State Properties, who became the Permanent Representative from the Russian Empire at that Institute – the Chairman of the Committee for Russia's Affairs.

In 1945, when the UN was founded, the Institute provided the basis for its Food and Agricultural Organization (FAO). The Institute practically ceased to exist in 1948. Its archives and library were "inherited" by the FAO, and became the starting point for the Memorial Library, named after David Lubin.

It should be noted that Russia participated in all the pre-war Congresses of the Union of Forest Experiment Stations, except for the first one. In 1914, "Russia intended to delegate its representative to the Congress. The occurred global events, probably, prevented from holding that

Congress; and the forthcoming gross changes in international relations are expected to have their imprint both on the very idea of forest experimentation and on the implementation of the idea. Certainly, now, their implications for the future are unpredictable" (Орлов 1915, p. 196).

It was not until over 10 years after the War, that the Union could hold its 7th Congress. The decision to do it was made at the 1st World Forestry Congress (WFC) in Rome (April 29 - May 5, 1926), which was attended by many members of the International Union of Forest Experiment Stations (Speer 1981).

At that time, Hungary could have taken the lead in the revival of the Union because the leadership de jure rested with it, and its delegates attended the WFC in Rome. But Professor Vadaš, Chairman of the Union, had passed away, and no representatives of the Hungarian Forest Experiment Station were present at the Congress in Rome, so Hungary remained inactive. However, "a special meeting was held for the purpose of re-awakening of the activity of this association" (IUFRO 1936a, p. 3). Sweden undertook preliminary work to prepare the Congress under the aegis of Professor Henrik Hesselman and accomplished it, thanks to energetic actions of the Swedish Forest Experiment Station. As a result of their efforts, "the 7th Congress of the International Union of Forest Experiment Stations could meet in 1929 in Stockholm to give a new life to the Union after the interruption" (IUFRO 1936a, p. 3).

Part Three
Between the Wars (the 1920s - 1945)

Chapter 11
Congress VII - July 14-27, 1929, Stockholm, Sweden

Most of the information for this Chapter was drawn from the Proceedings of the 7th Congress of the International Union of Forest Experiment Stations, edited by Secretary General Sven Petrini and printed by Stockholm Publisher Tsentraltrytskerit in 1930 (IUFRO 1929a), as well as from the evidence provided by Congress participants (Tyurin, 1929a, b; Guillebaud 1929).

It was the first Congress, held in summer, among other reasons, because of the climate in Sweden. In addition, the organizers wanted to give enough time for the traditional exchange of views, demonstration of practical achievements in forestry during a tour and discussions during a trip through the country. According to available information from and about the Congress (IUFRO 1929a, 1992a), it was held on July 14-27, 1929, but these dates did not include a weeklong tour through the country after the Congress on July 28–August 4, 1929 (IUFRO 1929b Tyurin 1929a, b). Overall, the Congress lasted 23 days and was held in three stages: (1) the pre-Congress excursion on July 13-21, 1929, in Southern Sweden; (2) the meeting in Stockholm on July 22-28, 1929; and (3) the post-Congress tours on July 29-August 4, 1929, in Central Sweden (IUFRO 1929a, p.6).

Overview

The first post-war Congress of the Union brought together more participants than any other of the pre-war Congresses: 205 delegates from 31 countries. The agenda included 10 meetings (3 plenary sessions and 7 sessions of the 4 sections), and also yielded the highest number of reports: 105 reports, including 103 scientific papers (IUFRO 1929a-b)[80].

It was for the first time that the Congress was attended by representatives of the USSR (IUFRO 1929a), as well as delegates from Australia, India and Africa (Egypt) which were part of the British Empire Delegation (Guillebaud 1929). So, the Stockholm Congress was the first meeting of representatives from all the continents.

"The initiative to convene the Congress emerged from Sweden, from the Swedish Forest Experiment Station, headed by Professor Hesselman. The idea to summon that meeting was supported by the Swedish Government; and in September 1928, provisional steps were made to convene the Congress. It was scheduled for July 22-27, 1929, and Stockholm (Sweden) was identified as its venue.

Almost all countries involved in IUFRO welcomed the idea and accepted the invitation of the Swedish Forest Experiment Station; and forest scientists commenced their preparations for the Congress. The Swedish Forest Experiment Station assumed all the burden of the Congress preparation and demonstrated organizational excellence.

[80] According to Guillebaud, there were 97 papers for discussion in the sections (Guillebaud 1929).

Two one-week excursions were planned (before and after the Congress), and the Congress events were to take 3 weeks – from July 14 to August 4, 1929.

Shortly before the Congress, its participants were supplied with all needed information so that they could get familiarized with the abstracts of expected reports, draft program of the Congress, guidebook for the excursions and list of the delegates. All this made the work of the Congress easier and helped its participants to become acquainted with each other and with forests and forestry in Sweden" (Тюрин 1929a, p. 96-97).

Between the pre- and post-Congress excursions, five days (July 22, 23, 25, 26 and 27, 1929) were earmarked in the agenda for sessions and discussions. The Congress participants arrived on July 21, 1929, and in the evening of the same day, the International Committee held its meeting (at 05:00 p.m.) which smoothly turned into a friendly dinner (at 07:00 p.m.). Professor Henrik Hesselman (1929) was elected Chairman for the Congress.

Scientific program

The large number of participants and broadened range of issues for discussion meant that the Congress could not have many plenary sessions (Schmutzenhofer 1996a). Sessions of the Congress "were meant to read papers, report about research work and present the revised Statutes of The International Union of Forest Research Stations. Most papers were read during the sessions which took place when the Congress was divided into the four sections, but some were read at plenary sessions. The abstracts of the papers had been printed as a separate book titled *Abstracts of Expected Papers* and disseminated to delegates about a month before the Congress. Some printed papers were in German while other ones were in French and English. 82 papers were expected. Their abstracts were printed on 160 pages: two pages for each abstract" (Тюрин 1929b, p. 53-54).

The Congress opened on July 22 at 10:00 a.m. in the Higher School of Forestry[81].

At the morning plenary session, Arvid Lindman, Swedish Prime Minister, delivered his welcome address to the Congress. The presence of such a high-standing guest underscored the importance of the Union for restoring international relations between forest organizations. Professor H. Hesselman, Chairman of the Union, reported about the reorganization of the International Union of Forest Experiment Stations. Then, Sven Petrini (Sweden), Secretary General of the Union, presented a proposal of the Swedish Congress Organizing Committee. Professor L. von Post (Sweden) delivered a keynote address on the historical development of forests in Central Europe in the light of recent studies of plant pollen[82].

In the afternoon, a plenary session was held to present several papers, including the reports of Professor Philipp Flury (Switzerland) about the international forest bibliography development[83]. He noted that after the Congress in Vienna in 1903, when the Bibliography Commission had been set up, it held several meetings with the last one dated 1926 (Zurich). It was recommended to take the classification of Melville Dewey, based on the bibliographic decimal system. Professor Flury stressed the need to adopt a decision on this issue and start the work immediately.

In his speech, Professor Oppermann (Denmark)[84] highlighted some challenges facing the International Union of Forest Experiment Stations, including:

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[81] In 1928, the School celebrated its 100th anniversary, and the celebration was attended by Professor N.P. Kobranov (Мерзленко 2007).

[82] von Post, L., Suede: Die postarktische Geschichte der europäischen Wälder nach den vorliegenden Pollendiagrammen.

[83] Flury, Ph., Suisse: Bericht zu Traktandum: «Beschaffung einer internationalen forstlichen Bibliographie».

[84] Oppermann, A., Danemark: Zukunftsaufgaben für den internationalen Verband forstlicher Versuchsanstalten.

- Collection of more detailed information about the maximum yield of various tree species in different countries and its dissemination to Experiment Stations;
- Forest topography or topographical description of the principal forest areas in each country;
- Annual report on the activities and personnel of forest experiment stations;
- Forest vocabularies defining the forestry terms in general use;
- Forest guides which included descriptions of interesting and important forests;
- Introduction to forest literature for each country;
- International forest history;
- Library of the classic works on forestry.

During the discussion, E.G. Vasquez and J. Ugarte (Spain) proposed to create a permanent international committee; Professor Ph. Guinier (France) proposed to set up an International Organization for the Seed Collection of Guaranteed Origin; Vazquez and Ugarte also proposed to use the English language as the official language of the Congress.

The first working day ended with the proposal from Anders Fjelstad (Norway) from the International Institute of Agriculture (IIA) [85] to establish cooperation between his institute and the International Union of Forest Experiment Stations.

During the plenary session on July 23, 1929, J. Stoklasa (Czechoslovakia) spoke about the microbiological processes in the formation of soil humus[86]. Then, the Congress was divided into four Sections, dealing specifically with Silviculture[87], Forest Ecology, Forest Soil Science, and Entomology.

Section 1 *Silviculture* discussed a number of issues related to progress of forestry research in different countries. The meeting on July 23, 1929, was attended by representatives of America, the British Empire, Finland, France, Japan, Spain, the Soviet Union, and Switzerland. Professors S.P. Melnik, M.E. Tkachenko, B.A. Ivashkevich, all from the USSR, sent their reports to this Section.

On July 25, 1929, the participants discussed forest inventory and equipment, sample plots, prospects for improvement of measurement instruments and methods to make them more precise. The common challenges and growing complexity of the work were acknowledged. In particular, Dr. M.L.Anderson (Great Britain) described sample plot techniques with reference to British conditions.

On 26 July, 1929, Professor E. Wiedemann (Germany)[88] presented the main findings from the latest operational data on the testing areas in Prussia, which were laid many years ago by Professor Adam Schwappach. He also said that about 100 new plots had been incorporated in the research a year ago, with most of them meant for comparing the thinning methods. Dr. Yrjö Ilvessalo (Finland) presented a paper about the methods of site condition classification by forest type in Finland and the possibilities for finding a uniform basis for the study of growth and yield in different countries. Interesting papers were presented by Professor Arvids Kalnins (Latvia)[89] about technical properties of wood in Latvia[90]. Professor V.V. Shkatelov (the USSR) was to deliver his report in this session.

The meetings of Section 2 *Forest Ecology* were held on July 23 and 25, 1929, and addressed a variety of topics such as introduction of exotic species in arboreta, ecology of individual trees

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[85] The International Institute of Agriculture was founded in 1905 in Rome. When the UN FAO was establishe it inherited all the property and archives of the Institute. Later, Anders Felstad became the Representative of Norway in the FAO.

[86] Die mikrobiologischen Vorgänge bei der Humusbildung im Boden.

[87] General Forestry (Guillbaud 1929).

[88] Wiedemann, E., Allemagne: Über die Durchforstungs- und Lichtungs flächen der Preussischen Forstlichen Versuchsanstalt.

[89] Guillebaud (1929, p.140) erroneously affiliated Dr. A.Kalnins with Lithuania.

[90] Kalninsch, A. Lettonie: Die technischen Eigenschaften der Hölzer Lettlands.

species, root competition, natural regeneration, seed supply and control of forest seeds for international trade, forest fire and fungal diseases. The presentations covered a wide range of studies in countries such as Chile, Czechoslovakia, Germany, Finland, Hungary, Sweden, the USA, and the USSR. Interesting papers were delivered about climate and soil in relation to forest management (G.A. Pearson, the USA), forest fire research in America (E.I. Kotok, the USA), climatic provinces and forests in Chile (H. Gisborne, Chile), and other topics. A paper by Professor A.A. Yunitskiy (the USSR) was scheduled for July 23, 1929, and on July 26, 1929, Professor N.P. Kobranov delivered his paper[91].

Section 3 *Forest Soil Science* included many interesting and important presentations, made by Dr. Tamm, Professor Hesselmann and Dr. Melin (Sweden), Professor Weiss and Dr. Bornebusch (Denmark), and Dr. Waksman (USA) on the types of soil, content of humus, soil microorganisms, and afforestation of wastelands. Professor C.H. Bornebush in particular delivered an interesting paper on fauna of forest soil. Professors P.G. Pogrebnyak and N.N. Stepanov from the USSR sent their papers to this section to be presented on July 23 and 25, 1929, respectively. It should be noted that for the first time in the history of the International Union, a report was made by a woman – Erica Goldbach from Czechoslovakia, who spoke about the biochemical processes of cellulose decomposition[92].

In Section 4 *Forest Entomology*, 12 papers were read. Professor I. Trägårdh (Sweden) presented two papers: one about the methods of investigating the fauna in dying trees, and the other about assessing the losses of tree assimilation organs due to damage caused by defoliating insects (*Monochammus sutor* L.)[93]. In one of his four papers, Dr. J. Komarek (Czechoslovakia) highlighted forest pest control through applying arsenic products[94]. Professor S.S. Prozorov (the USSR) and P.N. Spessivtseff, representing Sweden, were to deliver their papers also in this Section.

It should be noted that the Forest Entomology Section was newly established at that Congress (Schmutzenhofer 1996b).

The final plenary session of the Congress was held on July 27, 1929. On that day, the Commission on Bibliography was established to address forest bibliography. It consisted of 27 people, including Professor N.P. Kobranov from the USSR. The standing committee of this Commission to work at forest bibliography consisted of Dr. Flury (Switzerland), Perren (France), Professors Oppermann (Denmark), Troup (Great Britain), Weber (Germany), and Hesselink (Holland). The Congress approved the General Permanent Committee. The meeting ended with the demonstration of a film about forestry operations in Japan (Guillebaud 1929, IUFRO 1929a).

Organizational matters

At the final plenary session of the Congress, on Saturday, July 27, 1929, the Statutes of the Union was presented to the International Committee (Guillebaud 1929; IUFRO 1929a)[95].

Statutes

Final version as adopted by the International Committee at its meeting of July 26th 1929.

[91] No reference to his paper are found in the Proceedings of the Congress.
[92] Goldbach, Erica, Tcheco-Slovaquie: Die biochemischen Prozesse des Abbaues der Zellulose.
[93] Trägårdh, L . Suede: Über den Schusterbock (Monochammus sutor, L.) und dessen Bekämpfung.
[94] Komarek, J., Tcheco-Slovaquie: Erleichterung des Verfahrens bei Verwendung von Arsengiften.
[95] It was published in Russian for the first time in an article by Professor A.V. Tyurin (Tyurin, 1929b).

§ 1. The name of the association is “The International Union of Forest Research Organizations”.

§ 2. The aim of the Union is to promote international cooperation in the various branches of forest research. It exercises its activity especially:

- by summoning regular meetings or congresses, combined or not with excursions for the purpose of studying forestry,
- by working, as far as was possible and expedient, for the introduction of uniform nomenclature and standardization of methods in forest research work,
- by providing for the establishment of an international forestry Bibliography.

§ 3. Two classes of membership are recognized, (a) Ordinary Members, and (b) Associate Members.

(a) Ordinary members shall be of two classes.

(1) State established Forest Research Organizations. These become members of the Union merely by giving notice to the President of the Union of their intention to join.

(2) Organizations carrying on the same kind of work as State-established Forest Research Organizations and founded by Universities or other corporations. These may be elected as ordinary members, upon the nomination of the representative of their country (Article 6, paragraph 1) and on the proposal of the Permanent Committee, by a resolution passed by the International Committee.

(b) Associate members shall be private individuals engaged in forest research. The may be elected by the Permanent Committee upon the nomination of the representative of their country, subject to the ratification by a two-thirds majority of the International Committee.

§ 4. The organs of the Union are:

(a) the Congress,

(b) the International Committee,

(c) the Permanent Committee,

(d) the President,

(e) the Secretary General.

§ 5. The Congress, which is the general assembly of the Union, discusses scientific forestry questions. It consists of:

- the members mentioned in article 3,
- any persons engaged in forest research receiving a special invitation.

Every ordinary member of the Union has the right of being represented by as many delegates as it chooses.

The Congress meets every three to five years on the initiative of the president.

§ 6. The International Committee, which is the highest authority for all matters of organization and management (subject to the provisions of art. 10) shall consist of one representative from each country, that has any ordinary member in the Union, or from which a request for admission has been addressed to the Union, the countries being differentiated according to the same principles as those applied in the Universal Postal Union. The representative of each country should usually be a person engaged in forest research.

The International Committee shall meet generally only in connection with a Congress. It can, however, meet in extraordinary session either upon call by the president or at the request of one-third of its members.

It fixes the year of the next Congress and the country in which it is to be held.

It elects the President of the Union, the members of the Permanent Committee and those of the Bibliographical Commission.

It examines the report of the Permanent Committee and the accounts of the Union.

It decides finally the action to be taken upon the proposals submitted by the Congress and its sections, as well as the admission of the Associate Members mentioned in Article 3-a-2 and 3-b.

It has the right of appointing special commissions, on which experts who are not members of the Union may be invited to sit.

Every ordinary member of the Union has the right to bring before the international committee any individual proposal concerning the work of the Union, and to have such proposal presented to the committee by its representative.

§ 7. The Permanent Committee, which is the executive organ of the Union, shall consist of the president, a vice-president, and five members; it shall be elected by the International Committee by a majority vote. Its period of office shall be from the first of January of the year following the close of the Congress during which it is elected, to December 31st following the next Congress.

§ 8. The President shall preside over the Congress, the International Committee, and the Permanent Committee. He shall be elected by the International Committee at every Congress and must be a national of the country where the next Congress is to be held. His term of office shall be from the first of January of the year following the close of the Congress during which he is elected, to December 31st following the next Congress.

Should the office of President become vacant before the expiration of his term of office, the Permanent Committee shall elect a new President, who shall be a national of the same country.

§ 9. The Secretary General is a permanent official of the Union, shall carry out its decisions, deal with current affairs, and keep the books under the supervision of the President and the Permanent Committee. He shall be appointed by the International Committee which shall also fix his salary. He shall be subject to re-election at each Congress.

The Permanent Committee shall supervise his whole activity.

Should the office of the Secretary General become vacant before the expiration of his term of office, the Permanent Committee shall appoint a new Secretary General.

The residence of the Secretary General shall be legally considered as the seat of the Union.

§ 10. Ordinary members shall pay to the Union a minimum annual subscription of 120 Swiss Francs. Any increase in this subscription may only be decided with the consent of the majority of the members concerned.

Associate members pay a minimum annual subscription of 20 Swiss Francs.

All subscriptions shall be due on January 1st of each year, and shall be paid to the Secretary General by January 31st; the full annual subscriptions shall be paid for the year of admission.

§ 11. The funds of the Union shall be administered by the Permanent Committee, which shall be liable to render account to the International Committee. The accounts of the Union shall be kept by the Secretary General, who shall also be able to sign cheques and receipts.

§ 12. The decisions of the International Committee shall be taken by a simple majority of the votes cast, provided that they are approved by at least one-third of the entire membership of the International Committee.

Any change in the Constitution of the Union, as well as in the application of the provisions contained in Article 3, paragraph 1, requires a majority of two-thirds of the entire membership of the International Committee.

The new name of the organization (*International Union of Forestry Research Organizations*/ IUFRO) was adopted at this Congress to reflect the broadened range of organizations which were now part of the Union. These included not only Experiment Stations, but also universities and other institutions and groups. To revive the functioning of the Union, new Statutes were drafted under the leadership of Professor H. Hesselman and adopted with a few minor amendments. “In the Statutes,

special emphasis was placed on the Union's functions within the framework of the promotion of international scientific cooperation in the field of forestry with regard to a standardization of the terminology and the establishment of an international bibliography" (Speer 1972, p. 13).

At the Congress, the question was raised whether the newly named organization (the International Union of Forestry Research Organizations) should be regarded as an entirely new organization or as the legal successor of the former International Union of Forest Experiment Stations. This issue was completely resolved, partly because at the World Forestry Congress (WFC) in 1926 in Rome, it was considered that from the legal point of view the Union had only suspended its functioning temporarily. Therefore, the first paragraph of the document, presented by the Swedish Institute, read that in 1929, "the International Union of Forest Experiment Stations will hold its 7th Congress in Stockholm ..." (IUFRO 1936, p.4).

Before the 1926 Congress, the Union had had no steering bodies except for the Congress and the Chairman. After changing the Statutes, the number of the Union member countries doubled compared with the pre-war membership, and its member organizations (institutes) represented five continents. As the workload of the President of the Union (who worked without remuneration) increased, a Secretary General position was introduced. The International Committee was identified as the supreme self-governing body which should meet only during the Congresses, and the decision-making powers were delegated to it from the Congress. Each Member Country was represented by one delegate in the International Committee. Finally, according to the Statutes of 1929, the Permanent Committee, which consisted of seven members, became the governing body of the Union between Congresses (Speer 1972, p. 13).

"According to the adopted Statutes, the International Committee (but not the Congress) elected members of the International Bureau of the Committee, consisting of 7 persons. It included representatives from the following countries: France (the Chairperson); Sweden (Secretary General); England, Germany, Italy, Switzerland and Poland. The Chairman of the Union is Professor Guinier; the Secretary General is Sven Petrini… Professor Guinier, new Chairman of the International Union of Forest Research Stations, will take this position since January 1, 1930… Prior to this date, the Union will be chaired, as it was previously, by Professor Hesselman. The Secretary General (and also the headquarters of the Union) will be based in Stockholm, at the Swedish Forest Experiment Station" (Тюрин 1929b, p. 56).

Interestingly, all the names were listed in the documents of the Congress of 1936: "In Stockholm, a Working Committee was elected as follows: President Guinier (France), Vice-President Roth (Hungary). Members: Robinson (England), Pavari (Italy), Jedlinski (Poland), Fabricius (Germany), Badoux (Switzerland), Munns (United States). The Secretary General: Petrini (Sweden)" (IUFRO 1936a, pp. 4, 6). It is likely that the representative of the United States was co-opted in the Committee after the Congress.

Two invitations were considered to host the next Congress. Logically, Hungary had an advantage over France, as it had been chosen as the venue of the meeting in 1910, which had been cancelled due to the war. Finally, it was decided to hold the next Congress in France, and to let Hungary host the subsequent Congress, as they were invited to do so in 1910. Professor Oudin from France, made a proposal on this matter. After lengthy negotiations and meetings, and owing to the energetic support of the representatives from Great Britain, North America and Italy (Sir R.L. Robinson, Mr. N.C. Munns and Dr. Aldo Pavari, respectively), it was resolved to hold 8th Congress in 1932 in France, and the 9th Congress in 1936 in Hungary (IUFRO 1936a, p. 6).

In summary, it was planned to hold the next Congresses in France in 1932 under the chairmanship of newly elected President Philibert Guinier (1929-1932), and in Hungary in 1936 under the chairmanship of Gyula Roth.

Since 1929, the Secretariat of the Union was based in Stockholm, so Secretary General Sven Petrini took care of the ongoing work (Schmutzenhofer 1996a), and made an indispensable contribution to the systematization and publication of the Congress Proceedings. It was the first truly well-documented Congress (Baltensweiler and Stark 1992).

Resolutions

The main output of the Congress was the adoption of the new Statutes of the Union. According to Professor Tyurin, the Stockholm meetings were meant primarily for drafting the Statutes to define the mission of the International Union of Forest Research Stations. It was drafted only by those delegates of the Congress who were official representatives of the countries (one representative from each country). Those representatives comprised the International Committee (IC), which became the highest body of the Union. In the IC, Russia was represented by Professor N.P. Kobranov. The final version of the Statutes (Regulation) was adopted by the International Committee on July 26, 1929 and presented only for information at the general meeting of the Congress's participants on July 27, 1929 (Тюрин 1929b, p. 54).

A number of statements and resolutions were passed by the various sections and remitted to the International Committee of the Congress for consideration (Guillebaud 1929):

(1) Resolution on establishing an organization in each country for the collection of forest seeds with assured origin under supervision of the forest service of the country, and a system of international exchange of such seeds (Ph. Guinier, France);

(2) Proposal to supply each publication with abstracts in the three official languages (German, French, English) at the end of each article, and to translate table headings in each column in these languages (A. Oudine, France);

(3) Resolution on public support for the establishment of nature parks and reserves in forest areas in view of their importance to forestry research (M. Sokolowski, Poland);

(4) Proposal to study all types of forests not only from the economic standpoint, but also to assess them, taking account of such resources as resin, bark, and cork, as well as grazing resources (E.G. Vasquez, Spain);

(5) Proposal to study characteristics of wood in relation to rational use and creation of growth conditions for producing wood with pre-set properties (H. Perren, France);

(6) Proposal to ensure careful consideration of practices for establishing replicated sample plots, e.g., to study different thinning techniques (R.L. Robinson, United Kingdom);

(7) Proposal to set up a special committee, consisting of scientists from different countries, to explore best practices of the establishment and measurement of sample plots, and measurement of growing and felled trees (E.N. Munns, USA);

(8) Resolution to establish a sub-committee to draft a standard list of mathematical symbols to be used by all members of the Union in forest calculations (J. Konsel, Czechoslovakia);

(9) Proposal to introduce international standard methods for the determination of chemical composition (strength) of wood, as was done earlier in the study of the mechanical properties of wood (A. Kalnins, Lithuania);

(10) Proposal to study the impact of thinning on the growth and development of trees and stands on the two types of sample plots (J. Grochowski, Poland);

(11) Resolutions passed by the Forest Ecology Section:

(i) The International Union of Forest Research Stations should request the Research Stations which are its members to undertake as far as may be possible the collection of forest seeds of different origin and from stands of good type with an exact specification of the origin (the latitude, longitude, elevation, and other ecological factors). The Forest Research Stations should notify the

General Secretary as soon as possible of any additional requirements of their own country in order to facilitate the distribution.

(ii) The Section of Forest Ecology attaches great importance to the preparation of a standardized description and considers that the International Committee of the Congress should appoint a sub-committee to prepare a standardized form of such description to be submitted at the next International Congress of Forest Research Stations. The Permanent Commission of the Union of Forest and Agricultural Research Stations of Czechoslovakia (Prague) was entrusted with the task to make necessary some enquiries (Guillebaud 1929);

(12) Resolution to ensure comparability of research at the international level through using uniform methods; to this end, respective guidelines should be drawn up by the Congress (J. Konsel, Czechoslovakia);

(13) Proposals to (i) establish an international committee to assure the origin of seeds in different countries; (ii) investigate stands of the same species and compare regional varieties; (iii) collect forest tree seeds only under the supervision of duly appointed experts, authorized to certify the seed collection time, locality, quantity and identity of the vendor (Guillebaud 1929, p. 140); (iv) ensure that the trade in forest seeds be under international control with regular publication of statistics (J. Konsel, Czechoslovakia);

(14) Proposal to incorporate climatic data in the local area description. It is necessary to mark the distance from the pilot area to meteorological stations, as well as mention the risks prevailing in the area such as thunderstorms and frosts, which can cause damage to local forests (L. Fabricius, Germany);

(15) Proposal to establish a special commission to study the issue of deterioration of sandy soils in forests of the Scots pine and to find practical solutions to the problem. Particularly, the following issues should be addressed: (i) disturbance of the surface layer during ploughing and mixing the soil layers; (ii) how to enhance the benefits from agricultural plants (potatoes, oats, rye, and beans) for the soil fertility; (iii) impact of understory hardwoods on the soils which are not subjected to mechanical stress; (iv) most suitable types of mixed stands on soils, treated in accordance with the first (i) or the second (ii) approach (A. Nemec, Czechoslovakia);

(16) Proposal to establish a special commission from 3 to 5 persons to discuss the forest humus nomenclature (C.H. Bornebusch, Denmark);

(17) The Section of Forest Entomology, in particular, pointed out that: (i) All important journals of the world were expected to announce the establishment of the International Association of Ipidologists; its Preparatory Committee included: P.V. Spessivtseff and I. Trägårdh from Sweden, Kemner and V. von Butovitsch from Germany; (ii) in view of that, it was advised to postpone the reorganization of the international service of peer reviewers until the International Entomological Congress in 1932 in Paris. Therefore, in this respect, the preparatory work should be assigned to the same Commission members (Spessivtseff, Trägårdh, Kemner and von Butovitsch).

Excursions

The sites to be visited were described in the booklet, prepared under the leadership of Karl Vanselow, Director of the Bavarian Forest Experiment Station (IUFRO 1929b).

Fortunately, Professor A.V. Tyurin gave us a wonderful description of the visits to forests and impressions of the forestry in Sweden (Tyurin, 1929a, b). It is presented below somewhat abridged and supplied with minor comments:

“On July 13-14, 1929, delegates started to arrive in Malmö. On July 14, 1929, the City and County Administration hosted an evening banquet on the occasion of the Congress, and over 100 delegates who had already arrived could meet each other and communicate. Among those who

arrived, there were scientists, know to Russian foresters, including: Vanselow and Fabricius from Germany; Munns from the USA; Troup from England; Eide from Norway; Jedlinski from Poland; Hesselman, Johnson, Petrini, and Wiebecke from Sweden; Flury, Badoux and Schadelin from Switzerland. Hearty and friendly relations were created at once.

The excursions started early in the morning of July 15, 1929. The itinerary for July 15 and 16, 1929, included visits to forests in Southern Sweden, in Skåne, near Malmö, Lund, Dalby, Kristianstad and the old Karsholm and Maltesholm Castles. The road from Malmö to Lund and Dalby runs through a forestless fertile plain. The soil consists of marlaceous brown earth on the latest moraine deposits, rich in marlstone. There are numerous closely located villages and individual farms; the fields are occupied with wheat and sugar beet crops: it is a sugar beet region of Sweden.

In the ancient times, this region had been covered with mixed beech-oak-aspen forests, cut down by human beings who had settled here very early. Not far from Dalby, we visited a small island of uneven-age forest on an area of 34 ha, set aside as a national part in 1918. This forest area, composed of the aspen, oak, elm and beech, is a monument to the forests once growing there. It is worthwhile to mention the locations of specific tree species within this small area: the aspen (*Fraxinus excelsior*) has chosen wet places, less humid places are occupied with the elm (*Ulmus glabra*); the beech (*Fagus silvatica*) is found on dry places; whereas oak (*Quercus pendunculata*) is abundant everywhere.

(…) At a distance of 7 km from Dalby, extensive areas of old spruce plantations grow; they were established in 1874-1887. During the excursion, much attention was paid to the oldest of them. The visited plantations were established in 1875 on rich stony loams along the range of hills by way of planting seedlings, produced from seeds of German origin. The plantations include sample area #54 with four sections 0.25 ha each. The first measurements were made in 1906 when the plantations were 31 years old" (Тюрин 1929a, p. 96-98).

As a forest cruiser and the author of the well-known universal yield tables, Professor Tyurin gave a detailed description of stand characteristics of the visited stands and compared them with stands in Russia and with his yield tables (Тюрин 1913, 1925a, 1926)[96].

He compared that area with later measurements: "The stand is very close to site class I; it was excessively dense in its young age. Since 1906, different silvicultural treatments have been practiced; section I was not thinned at all; section II was exposed to late low thinning of low intensity; section III was exposed to late low thinning, and section IV was exposed to late low thinning of very high intensity. In 1926, after the two decades of experimentation, the stand remains close to site class I. (…) It is noteworthy that in spite of the German origin of the spruce seeds, nothing damaging has happened with spruce stem forms. In my opinion, the natural removal of knots from stems was normal. Many delegates were convinced that on such barren land areas, even outside the natural range of spruce, spruce plantations give and will continue to give outstanding positive outcomes. But stands should be moderately thinned, avoiding high-intensity early and late thinning. At the age of about 90 years, these stands will be mature enough to produce maximum volumes of saw logs. Looking at the above described man-made spruce stands, growing outside the natural spruce range, I remembered excellent Russian spruce forests, growing along the northern border of the Central Black-Earth Oblast[97] on grey clay loam soils and degraded black soils, and mixed with

[96] A.V. Tyurin started to develop his Universal Yield Tables from assessing the growth of normal pine stands in the Arkhangelsk Province (Тюрин 1913), and later, assessed birch and spruce growth (Тюрин 1925a, 1926).

[97] The Central Black-Earth Oblast was an administrative and territorial unit in the Russian Soviet Federative Socialist Republic in 1928-1934; its centre was the City of Voronezh.

plantings, and also outside the natural spruce range. They develop the regularities of site class I" (Тюрин 1929a, p. 98-99).

Professor Tyurin was rather emphatic in his opinion about another demonstrated area: "The impressions of the visit to the site of the described experiment testify to the effect that crown thinning of such spruce stands is hardly successful, and moderate late thinning would have been more appropriate there. Swedes thought that owing to the Swedish origin of the seeds, these spruce stands had better natural removal of knots from stems, comparted with spruce stands of site class I in the previous sample area (sample #54), produced from German seeds, but I did not see it" (*ibid.*, p. 99).

In the vicinity of Kristianstad, the participants visited excellent stands of the European larch as well as the best Swedish natural beech stands, aged 80-250 years. Tyurin wrote: "The beech stands look magnificent, and Swedish foresters are passionate about them. They are taken by with the idea to restore the former tree vegetation in Southern Sweden, in Skåne. However, their yield is lower than that of the larch stands, to say nothing about the spruce stands." (*ibid.*, p. 100).

Summarizing the impressions of the trip through Southern Sweden, Professor A.V. Tyurin concluded: "walking under the canopy of the beautiful beech forest in the Bokenäset forest allotment and, later in the forest allotment near the Maltesholm Castle, I could not but think that with all the beauty of the beech forests and all their emotional charge, associated for Swedes with their past, their yield was lower than that of other species, and that cultivation of pure beech forests would have to become a practice of the past. With such thoughts, we left Southern Sweden with its mild climate (average annual temperature: +7ºC), and its long rich general culture and intensive forest-related culture" (Тюрин 1929a, p. 102).

On July 17, 1929, the tour participants took a train to go from Kristianstad through Örebro to the Dalarna (Dalecarlia), a County in Central Sweden, called 'the Heart of Sweden'. They spent 4 days there (July 17-20, 1929), visiting coniferous forests (publicly-owned forests on an area of 40,000 ha) in the training forest management unit of the Swedish Forest Institute at Malingsbo, located at a distance of 25 km from Skinnskatteberg. They also visited stands of the Swedish Forest Experiment Station in Siliansfors, situated at a distance of 22 km from the City of Mora.

In Malingsbo, charcoal had been produced from small-sized wood for the mining industry for a long time. The decline in production of iron ore gave an opportunity to manage forests for large-sized timber. Nevertheless, the forest management unit continued to employ 75 charcoal dealers and 85 full-time workers, who worked under the supervision of 6 foresters and one forest manager with his assistant. "In Malingsbo, the demonstrated pine/spruce forest cutting and regeneration practices resembled my regeneration practice and theory for pine and pine/spruce stands in the Bryansk forests as described in my book *Principles of Forest Management in Pine Forests*" (*ibid.*, p. 102).

"In Siliansfors, we visited stands, covering an area of about 1,000 ha, which had been earlier owned by the mining joint stock company, called *Stora Kopparberg*, and given to the Swedish Forest Experiment Station in 1921 to be used for experiments. As for the *Stora Kopparberg* Company[98], it seems to be the oldest joint stock company in Europe: it dates back to the late 13th century, and initially (for many centuries), its mission was to mine and process copper in the mountains, surrounding the City of Falun, centre of Dalecarlia. Now, the copper deposits are almost depleted, but the joint stock company lives and prospers as earlier, owing to its well-developed business in iron, steel and wood-working industries. The company has about 375,000 ha of land with 70% of the area being productive forest land. It uses its land for agricultural purposes and generates electric

[98] The well-known company had had this name for a long time, though had often been called simply *Stora*; upon merge with the *Enso-Gutzeit Oy* Finnish Timber Industry Company in 1998, it was renamed into *Stora-Enso Oyj*. It is one of the biggest timber industry companies in the world.

power from its rivers. We visited the *Kwarnsweden* Paper Mill not far from Falun – it is a very big and well-managed paper production facility of the company" (Тюрин 1929a, pp. 104, 106).

On July 20, 1929, the group went from Falun through Uppsala to Stockholm where "the other participants of the Congress directly arrived as they had not wanted to take the pre-Congress excursions through Southern and Central Sweden" (Тюрин 1929b, p. 43).

During the Congress, another excursion was offered: on July 24, 1929, at 8:26 a.m., the group departed from the Central Railway Station in Stockholm (IUFRO 1929b). Professor Tyurin described it as follows:

"The excursion provided the opportunity to visit forests in Eastern Sweden between Lakes Vättern and Mälaren and the Baltic Sea, in the vicinity of the City of Katrineholm, situated at a distance of 100-120 km to the north from Stockholm in Södermanland. (…) The destination of the excursion was the Erisberg forest estate, one of the biggest forest enterprises in that province. Its area is 18,342 ha, where the productive forest area accounts for 63%, fields and meadows occupy 25% and the share of non-arable land is 12%. Mixed pine/spruce stands prevail in the estate. On suitable forest soils, the average growing stock is about 200 cubic m per ha. The increment is estimated at 4.0 cubic m per ha. The pine and spruce rotations are, respectively, 100 years and 70 years while the rotation for hardwoods is 50-70 years. Natural regeneration is good, especially on sandy soils on eskers or along them. On clay and clay-loam soils, planting and sowing are needed. Earlier, only clear cutting was practiced when a moderate number of pine seed trees were left growing. (…) It should be noted that in both Erisberg and Malingsbo, cutovers do not have regular forms, coinciding with the configuration of mature forest area to be cut. In Erisberg, the stands are distributed by age class very evenly as a result of good forest management, which has been practiced for a long time.

Not far from Katrineholm, in Mogetorp, we saw one of the best pine stands in Erisberg and in Sweden, it has the second storey of spruce, aged 140-150 years with a permanent sample area, established by the Forest Experiment Station. (…) In the locality, called Davidstorp (also in the Erisberg estate), the demonstration included an example of final cutting in one pine/spruce stand with natural regeneration. The stand grows on a wide esker; it is 120-140 years old and belongs to site class II/III. About 10 years before the final cutting in 1911 and 1913, it was intensively thinned. As of the time of the demonstration, the stand canopy was still there, with its stocking estimated at 0.3. Prior to the final cutting, there had been abundant berry-bearing plants, but now, they are somewhat less abundant; and the same may be said about mosses of the *Hylocomium* genus. The coarse humus decomposition was followed by good regeneration: the emerged young growth of pine is estimated at about 30.000 plants per ha, that of spruce is 1,000 plants per ha and that of the birch is also 1,000 plants per ha. In the nearest years, the residual canopy of the old growth would be cut down. Both the stand and its regeneration practices have very much in common with our mixed pine/spruce stands in the Bryansk Experimental Forest Management Unit – specifically, gradual cutting and soil harrowing for soil mineralization to promote regeneration.

(…) On Saturday, July 27, 1929, following the presentation of the remaining papers and adoption of key decisions of the Union of Forest Research Stations, the last excursion of the Congress led the participants to forests in Northern Sweden. It was scheduled for July 28 - August 4, 1929. Its itinerary was as follows: Stockholm–Bispgården–Sollefteå–Väja–Vindeln–Lycksele–Storuman–Hoting–Östersund–Öre. In Öre, the delegates were to have a farewell lunch before the departure. The excursion itinerary was followed with the superb punctuality, like during the previous excursions." (Тюрин 1929b, p. 46).

In the morning of July 28, 1929, the tour group arrived in Bispgården in Jämtland (Northern Swede, 63°N) at a distance of 100 km from the City of Östersund and from the Gulf of Bothnia. "The terrain is cut through by deep river valleys. The average temperature ranges from +1 to -2; the

precipitation is 460 mm. The forests, like in all Northern Sweden, consist of pine and spruce with inclusions of the birch." (Тюрин 1929b, p. 46).

"Late at night, our train arrived from Bispgården at Sollefteå, situated on the bank of the Ångerman River. It is a small town (about 3,000 residents), cosily and beautifully located on the right bank of the river where the downstream navigation starts. It is perhaps the only Swedish river with downstream navigation. The other rivers are cataracted and, for this reason, may be used only for floating of loose logs.

The group took a boat trip downstream along the same river to Sollefteå to arrive at the locality called Väja (about 60 km.): [here] there are sawmills and paper mills, supplied with wood floating from the upper part of the Ångerman River. The Ångerman River resembles our Dvina in miniature. In the mouths, both of them harbour wood-processing facilities, but the Ångerman River is at least 10 times less powerful than our Dvina though it is the largest river in Sweden and the largest forested basin. (…)

In this basin, the total length of floating routes is about 3,000 km. (…) Looking at the floating wood from the boat, we could see the thinness of the logs, harvested in the forests. (…) We found out that the average volume of a log floating along the Ångerman River was about 4 cubic feet or about 0.1 cubic m.

On the bank of the Ångerman River, in Väja, we visited wood-processing facilities (a sawmill, paper mill and a pulp and paper mill) and were impressed by their management. Their excellent operation and external amenities resembled Shergold' sawmills in Arkhangelsk and those of the Society of Kem Mills in the Kem City, which I had visited in 1911 and 1912. The management of the latter ones was not worse than in Väja. They remain as good now" (Тюрин 1929b, pp. 48-9).

The participants saw bogs, and were acquainted with a spore and pollen analysis of deposits, an investigation of the glacier movement, forest types and other specific activities. In spite of the high latitude and severe climate, the forest soil bogging continued there.

In the vicinity of Öresund (in Jämtland), the excursion highlighted experimental activities, related to seed provenance, and its participant Professor Tyurin described that part of the tour as follows: "The experiments were established in forests in the Island Frösön at about 300 m above sea level. The average temperature is about +1.8° C, and precipitation rate is 470 mm. The soils are rich in lime and are fertile, owing to the Silurian limestones and cleaving stones, typical of the western border of Jämtland.

The issue of seed provenance became very acute for Sweden in the late 19th century due to the sad outcomes of efforts to cultivate pine plantations from German seeds. In Northern Sweden, such efforts also had sad results with seeds from Southern Sweden. This leads to the conclusion that each locality should use its own seeds. But for Northern Sweden, this conclusion has lost its relevance because pine fruition is very rare here and pine seeds do not always ripen. It was necessary to look for opportunities to use seeds from locations to the south to procure them on an annual basis and have reliable and good plantations.

To this end, in the Island Frösön, near Östersund, pine plantations were established from seeds of various origins under the leadership of presently deceased Professor Scott and Senior Forester E. Vibek. The seeds had been supplied from different Swedish provinces and also from Germany and France. (…)

As regards the importance of the geographical origin of pine seeds, it should be noted that almost all the trees from German pine seeds (from Eberswalde) and French pine seeds (from the Pyrenees) perished; and even though some trees survived, they have extremely bad form(s). As for the experiments with spruce seeds, the demonstration showed that in contrast to pine, its different geographic origins did not affect its growth and form.

The scheduled excursions of the Congress ended with the demonstration of plantations near Öresund" (Тюрин 1929b, p. 52-53).

It is worthwhile to cite selected observations of the outstanding forester, concerning other aspects, such as the life of students: "For training purposes, the forest management unit has several modest small summer houses for professors and students of the Forest Institute. The Forest Institute has fewer than 100 students, and now the admission is reduced to 12 students. Therefore, only a few students were training in the Malingsbo forest: their number was hardly above 30. I saw them working in the forest, 'armed' with tree callipers, increment borers (which they eagerly used to measure the growth), unvaried pipes and handmade birch bailers. Students are diligent, perseverant in their work and merry during their leisure time. The songs they sang in our presence, resembled our Russian songs and the students resembled our forest students" (Тюрин 1929a, p. 102).

During the trip through Sweden, Professor Tyurin noted that good roads enabled forest managers and their assistants to cope with their vast forest management units and intensive forestry there. In that case, highways and cars saved the specialists' efforts and broadened the scope of their activities (*ibid.*, p. 103).

He drew special attention to community forests and their management: "In many localities in Sweden, there are forests, owned by several communities, included in the primary administrative unit ('*kommun'*, similar to our district), and they comprise a special integrated forest enterprise with its own forest manager. (…) Delegates of the Congress could visit such communal forests (about 2,500 ha) not far from Davidstorp in the Jonaker District. These forests are characterized with excellent health, old age, big growing stock and good wood quality. In the forests of this district, the Forest Experiment Station had established a number of sample areas to experiment with various silvicultural treatments in young pine stands. We visited them, but these experiments had not yet produced tangible results as they had been newly established. The excellent appearance of the communal forests and ability of the communities to put in place good joint forest management were in the focus of attention of many delegates of the Congress, especially, those representing countries where communal forests are on the verge of complete disappearance" (Тюрин 1929b, p. 45).

Other issues came into his view. Though they were seemingly unrelated directly to forestry, they were on top of agenda for scientific discussions. These issues concerned soil genesis processes in the postglacial period, also associated with plant development research, based on the spore and pollen analysis.

"In the vicinity of Bispgården, near Ragunda, the Indalsälven River has a very interesting place. In its vast up-to-date valley, the River ran till the year 1796 through the big Ragunda Lake and outflowed from the lake as a waterfall 30 m high. However, in 1796, during the high water period, the Indalsälven River broke through to have another runway in addition to the waterfall, which resulted into natural drainage of the lake. Now, its bottom is covered with most fertile fields and meadows. The bottom consists of stratified deposits of the vanished lake. Swedish scientist De Geer managed to establish that one layer had been deposited every year, and upon counting the layers in the cross-sections, he found that the lake had been formed about 3,500 years ago. He correlated these results with similar studies in other localities in Sweden and concluded that Northern Sweden had got free from the ice of the glacial period almost 8,000 years ago. In addition, his soil analysis of subcoastal and super-coastal areas of the vanished lake enabled him to have an insight into the soil genesis process and, in particular, the process of soil podsolization. The present-day soils of the lake bottom have already been weakly podsolized during the 130 years. Comparisons of such data made Swedish scientists conclude that in Northern Sweden, it took only about 1,000 years for the normal podsol to develop" (Тюрин 1929b, p. 48).

Soviet/Russian participation

The USSR sent 14 delegates to the Congress; their names are listed below, according to the List of participants (IUFRO 1929, p. 861-862): Andreas Guba (Charkow, Ukraine); Leonid Iwanoff (Ivanov), Professor (Leningrad); Boris Iwashkewitsch (Ivashkevich), Professor (Wladiwostok); Nikolaus Kobranoff (Kobranov), Prorector and Professor (Leningrad); Alexander Kolesnikoff (Kolesnikov), Professor (Charkow, Ukraine); Stephan Melnik (Melnik), Professor (Gory-Gorki, Belaruss); P.S.Pogrebnjak (Pogrebnyak), Director (Charkow, Ukraine); S.S. Prosorow (Prozorov) (Omsk); Vladimir Schkatelow (Shkatelov), Professor (Gory-Gorki); Nicholaj N. Stepanow (Stepanov), Professor (Leningrad); W.N. Sukatschew (Sukachev), Professor (Leningrad); A.W. Tjurin (Tyurin), Professor (Voronesch); Michael E.Tkatschenko (Tkachenko), Professor of Forestry (Leningrad); Alexander Yunitskiy, Professor of Forest Pathology and Forest Protection (Kazan).

The Organizing Committee was set up and Professor N. Kobranov (1883-1942) was elected Representative of the Soviet Union among 27 members of the International Committee for the organization of the Congress. The Committee was chaired by Professor H. Hesselman. In addition, Professor N. Kobranov was included in the Bibliographical Commission, also consisting of 27 members. Professor A. Tyurin (1882-1979) was elected one of the six Vice-Chairmen of the Forest Ecology Section.

Professor I.S. Melekhov reported that M.E. Tkachenko, A.V. Tyurin, P.S. Pogrebnyak and some other Soviet scientists did not attend the Stockholm Congress (1929), but their papers were read there. Perhaps, N.P. Kobranov was the only direct participant of the Congress from the USSR (A.Ya. Kalninsh represented Latvia which was not part of the USSR in the time) (Мелехов 1992b, p. 52-54). Specialists participating in the Congress were interested in the paper about selected forests in Northern Russia, prepared by Professor M.E. Tkachenko (Мелехов 1968, p. 171). As this was over 80 years ago, it is now difficult to figure out who was present or absent at the Congress. The List of Participants included 14 names of the members of the delegation from the Soviet Union; and the country submitted more than 10 out of the 100 papers to the Congress (IUFRO 1929a):

1. Professor B.A. Ivashkevich (1889-1936): The most important features of the structure and development of national forest resources (Iwaschkewitsch B.A., UdRSS: Die wichtigsten Eigenarten der Struktur und der Entwicklung der Urwaldbestände);

2. Professor N.P. Kobranov (1883-1942): Methodology and nomenclature in the study of natural and artificial regeneration processes in the forest (Kobranoff N.P., UdRSS: Die Methodik und Nomenklatur bei Untersuchungen der natürlichen und künstlichen Verjüngungsprozessen im Walde).

3. Professor A.I. Kolesnikov (1888-1965): Problems in forest genetics and the role of forestry research institutes, and some results of studies in this area in the Ukraine (Kolessnikoff A.I., UdRSS: Über die Notwendigkeit, die Probleme der forstlichen Genetik und Veredlung durch Forstversuchsanstalten zu studieren, und über einige Resultate der in der Ukraina zur Erforschung dieser Probleme angestellten Versuche);

4. Professor S.P. Melnik (1883-1938): Forest research in Belarus with due regard to the local peculiarities of forestry (Melnik S.P., UdRSS: Das forstliche Versuchswesen in Belaruss im Zusammenhange mit örtlichen Eigenheiten der Forstwirtschaft);

5. Professor P.S. Pogrebnyak (1900-1976): Methodological aspects of forest research, related to the forest types (Pogrebnjak P.S., UdRSS: Über die Methodik der Standortsunter suchungen in Verbindung mit den Waldtypen);

6. Professor S.S. Prozorov (1900-1985): Forest insect pest characteristics in Siberia – a case study in the Barnaul District (Prosorov S.S., UdRSS: Die waldentomologische Charakteristik der Bestände in der Tschumyschen Forstei des Bornaulschen Bezirkes in Sibirien);

7. Professor V.V. Shkatelov (1861-1940): Possibility of Scots pine tapping for manufacturing of rosin and turpentine (Schkatelow W., UdRSS: Sur la capacite de pin sylvestre pour la recolte de la gemme et pour la fabrication de colophane et d'essence de therebenthine);

8. Professor A.V. Tyurin (1882-1979): Structure of forest stands (Tjurin A., UdRSS: Die Konstruktion der Waldbestände);

9. Professor M.E. Tkachenko (1878-1950): Natural and selection forests in northern Russia (Tkatschenko M., UdSSR: Urwald und Plenterwald in Nord-Russland);

10. Professor A.A. Yunitsky (1878-1942): Need to undertake systematic studies of forest diseases in research institutions (Younitsky A., UdRSS: De la necessite d'etudes systematiques par les institutions experimentales des maladies des arbres forestiers).

A. Guba, L.A. Ivanov (1871-1962), N.N. Stepanov (1879-1941) and V.N. Sukachev (1880-1967) were not mentioned as speakers of the Congress.

It is noteworthy that, later, the biographical profiles of the Stockholm Congress participants from the USSR referred to it as 'the International Congress of Forest Experiment Stations' (Редько и Редько 2003), 'the International Congress on Forest Experimentation' (Мерзленко 2007), 'the 1st International Congress of Forest Experiment Stations' (Трипутина 2011) and 'the 2nd IUFRO Congress' (Погребняк 2014).

According to a biography of Professor A.I. Kolesnikov, in the late 1920s, he became a lead forest scientist and, therefore, in 1929, he attended the 1st International Congress of Forest Experiment Stations in Stockholm as the delegate from the Ukraine and delivered his substantive paper there. In addition, he advocated the idea of establishing an international network of forest experiment stations with 'a common program and shared goal' and even proposed an action plan for such an association (Трипутина 2011, pp. 40-41).

A publication about Professor P.S. Pogrebnyak says that he participated in the 2nd IUFRO Congress (1929) in Stockholm, the World Forestry Congress in Spain in 1967 as well as in many other conferences at the international level, at the level of the USSR and that of the Ukraine (Погребняк 2014).

According to a biographical note about Professor A.V. Tyurin, in 1919, when he was only 37 years old, he became a Professor, and a bit later, the Dean of the Forestry Faculty. In 1927, his article about the structure of normal forest stands was published; and two years later, he presented his methodology of assessing the growth of forest stands on the basis of the natural diameter classes at the International Congress of Forest Experiment Stations in Stockholm (Глазунов 2009, p. 158). His article about the trip to Sweden was published in the *Lesovod* Journal (Тюрин 1929a, b).

The description of Professor N.P. Kobranov's life and research work reads that "he participated in the International Congress on Forest Experimentation in Stockholm (1919) [read "1929" instead - V.T.], in the 2nd International Congress of Soil Scientists in Leningrad (1930)" and other international conferences (Мерзленко 2007, p. 52). Like many other foresters, Professor N.P. Kobranov gained good experience with forest experimentation when he was the Director of the Mariupol Experimental Forest Management Unit (since 1911) and the Director of the Voronezh Experiment Station (later, it was renamed into the Central Forest Experiment Station) and Consultant of the Leningrad Forestry Research Institute (1928–1941).

In 1915, he was elected Professor of the Chair of Silviculture of the Voronezh Institute of Agriculture, and, later, he became its Rector (1919-1920). He was the organizer and the first Dean of the Forest Faculty at the above Institute (1920-1924). He worked for some time (since 1923) at the Chair of Silviculture in the Moscow Forest Engineering Institute and then taught at the Leningrad Forest Academy (since 1925). In 1928-1929, he visited several countries, including Sweden where he represented the Forest Academy in 1928 when the Higher School of Forestry celebrated its 100th

anniversary in Stockholm (Путеводитель 2001, Мерзленко 2007). Before the described IUFRO Congress (1929), Professor N.P. Kobranov together with Professors L.A. Ivanov and V.N. Sukachev had prepared a collection of papers about the nature and operation of the training and experiment forest management units under the Leningrad Forest Institute (Природа и хозяйство 1928).

It should be also noted that other participants of the Congress worked in experimental forest management units as well. For instance, Professor S.P. Melnik (1883-1938) graduated from the Petersburg Forest Institute in 1911, and taught in the Kharkov Institute of Agriculture and Forestry since 1914; since 1923, he was a Professor of the Gorki Institute of Agriculture; and since 1926, he was the Director of the Forest Experiment Station of the Belorussian Soviet Socialist Republic (see, for instance, Мельник 1928). In April 1932, the Central Botanical Garden was established under the Academy of Science of the Belorussian Soviet Socialist Republic in Minsk, and on March 1, 1933, Professor S.P. Melnik was appointed its Director. Being a skilled specialist and talented manager, he elaborated the design, principles and research areas for the Botanical Garden. In the period of 1925-1933, Professor S.P. Melnik headed the Joint Chair of Silviculture and Dendrology in the Gorki Institute of Agriculture, which was renamed into the Belorussian Forest Engineering Institute in 1930. He was a Corresponding Member of the Academy of Science of the Belorussian Soviet Socialist Republic, and had over 70 publications (НАБ 2013).

Professor Alexandr A. Yunitskiy (1878-1942) graduated from the Petersburg Forest Academy, had an internship in 1901-1903 in France (at the National School of Forestry, Nancy) and in Germany (at the Eberswalde Forest Academy), and gained a wealth of experience there. In the beginning of his career, he worked as a forester in the Kherson and Voronezh Provinces and, then, as the Manager of the Kazan Experimental Forest Management Unit (since January 1912). Academician I.S. Melekhov mentioned his work in a publication: “The Kazan Experimental Forest Management Unit was opened in 1911. Its first forester was A.A. Yunitskiy. After the October Revolution, the Forest Management Unit together with the Raifa Training and Experimental Forest Management Unit (opened in 1919) provided capacity to start forest experimentation and research activities in Tatarstan. Those activities were implemented with inputs from many foresters, botanists and scientists from other fields (...) Some Russian foresters pioneered new approaches not only in silviculture, but also in engineering sciences (for example, in road engineering). A.A. Yunitskiy was such a specialist with a broad scope of skills” (Мелехов 1957, pp. 130, 137).

Professor M.M. Orlov, Chairman of the Forest Experimentation Committee, commended the performance of the Kazan Experimental Forest Management Unit in his report: “It is very pleasant to note that though the Kazan Experimental Forest Management Unit is a fairly new facility, it has already developed vibrant and close relations with the local forestry which was confirmed during the visit of 52 officials from the local Forest Department, led by its Director, to the Forest Management Unit in June of the current year; other evidence of the collaboration between the research and practical forestry includes the planting experiments established there with personal involvement of its Foresters Erlandets and Ulyev; as well as the keenness to develop forest experimentation and the communication between the Experimental and ordinary Forest Management Units under the Kazan Department to address many technical issues related to forestry. One should extend wishes of further reinforcement and development of the right organization and management of forest experimentation in the same direction” (Юницкий А.А. б.г., p. 3).

Later, Professor A.A. Yunitskiy became the organizer and the first Dean of the Forest Faculty, opened in the late 1918, under the Natural Science Department of the Faculty of Physics and Mathematics in the Kazan University. Hardly two years had passed since the publishing of Professor G.F. Morozov’s article about the need to open a higher school of forestry in Kazan (Морозов 1917): G.F. Morozov deemed it obviously insufficient to have only two higher schools

of forestry in such a vast and forest-rich country as Russia. It is another proof of managerial capabilities of A.A. Yunitskiy.

He was equally eager to work in such fields of knowledge as botany and chemistry, silviculture and forestry mensuration, forest technology and forest construction, but he paid special attention to his favourite area, plant health. He was considered to be one of the best specialists in this area. In the early 1920s, Professor A.A. Yunitskiy was recognized as an outstanding plant health specialist and the founder of the Volga School of Plant Health. He tried to make his students interested in plant pest management, too – for instance, in fighting against such dreadful enemies of forests as pernicious fungi and lichens (Патриоты русского леса 1993, p. 39). He was an all-round scholar; his publications included over 140 scientific works, some of them highlighting activities of the Experimental Forest Management Units in the Volga Region.

It is also important to mention Professor Sergey S. Prozorov (1900-1985), a well-known Siberian forest entomologist. He established and headed the Chairs of Forest Entomology (1930-1952) and Forest Protection (1952-1961) in the Siberian Institute of Forest Technology, which was re-organized unto the Siberian Institute of Technology in 1958 (Krasnoyarsk). He was the team leader for large-scale expedition-based studies on main species of forest pests in Siberia and Mongolia. In 1959-1960, he was the acting Director of the Forest Entomology Laboratory in the Institute of Forest and Wood under the Siberian Branch of the USSR Academy of Sciences, which moved from Moscow to Krasnoyarsk in that time (Баранчиков и Муратова 2014). In 1948, Professor S.S. Prozorov successfully defended his thesis and obtained the Degree of Doctor of Sciences in recognition of the Krasnoyarsk approach to forest entomology. In accordance with that approach, priorities in that area should include investigation of forest pest phytophagoues, composed predominantly by the fir, including the Siberian moth with its outbreaks detected in 1946 not far from Krasnoyarsk. S.S. Prozorov was the first to pay attention to the importance of entomophages for the regulation of Siberian moth populations. Later, this problem was thoroughly studied by N.G. Kolomiyts who was a follower of S.S. Prozorov (Баранчиков 2011, p. 5).

Interesting facts

The authors of this book deem it necessary to highlight the participation not only of the delegates from the USSR, but also those of Russian descent: entomologist P.N. Spessivtseff from the Entomology Department of the Swedish Royal Forest Experiment Station (Experimentalfaltet) and zoologist V.A. von Butovitsch from the Eberswalde Forest School.

Pavel Nikolaevich Spessivtseff (1866-1938) was a zoologist and entomologist.[99] He graduated from the Forest Institute, was a student of Professor N.A. Kholodkovskiy who headed the Chair of General and Applied Zoology in the period of 1885-1921 and taught zoology (СПбГЛТУ 2013). The names of N.A. Kholodkovskiy and his assistants I.Y. Shevyrev (since 1887), A.A. Silantyev (since 1890) and P.N. Spessivtseff (since 1899) are associated not only with the improved teaching of zoology in the Forest Institute, but also with the rapid and successful development of forest zoology and its related disciplines in Russia (СПбГЛТА 2003, p. 184). During his work as the assistant, P.N. Spessivtseff received a powerful impetus to choose a research career and to study insects – including, and in particular, bark beetles. He eventually became one of the most prominent disciples of Professor N.A. Kholodkovskiy (*ibid.*, p. 186). P.N. Spessivtseff was a freelance lecturer at the St. Petersburg Forest Institute, and according to some sources, he could study/teach in the Heidelberg University (Фокин 2013). P.N. Spessivtseff, Doctor of Zoology and Forest Science, was

[99] According to П.Е.Ковалевский (1973, p. 148), P.N. Spessivtseff was a soil scientist while according to М.Ю.Сорокина (2013), he was a soil scientist and entomologist.

the author of fundamental works published in Russia and Sweden, including his studies on the biology and ecology of bark beetles such as: the *Practical Identifier of Bark Beetles of the main tree species in European Russia (expect for the Crimea and Caucasus*, as well as the *Identifier of Bark Beetles* (Спесивцев 1913-1934). After his emigration to Sweden in 1922, he worked as an entomologist for the Royal Forest Experiment Station in Stockholm (Сорокина 2013).

In 1930, in the publication, called *Memorandum to the Forest Entomologists and Other Entomologists who are interested in the Study of Bark Beetles*, P.N. Spessivtseff noted: "At the meeting of the Forest Entomology Section of the International Congress of Forest Experiment Station in Stockholm in July 1929, I proposed to set up an International Society of Ipidologists, saying that the recent 10-20 years saw a significant growth in the interest to the systematics and biology of bark beetles; such regions as Siberia, Caucasus, Balkans and Mediterranean with their largely unknown fauna of bark beetles, were starting to attract attention of entomologists" (Spessivtseff 1930, p. 22). He identified existing problems and possible ways to address them, and suggested that all who wanted should make a team to study bark beetles. P.N. Spessivtseff died in Stockholm and was buried in the local Forest Graveyard (Сорокина 2013).

Another entomologist, Victor A. von Butovitsch (1901-1992) was born in Warsaw, spent his childhood in St. Petersburg, and studied in Berlin and Eberswalde, where he lived until 1932 when he moved to Stockholm. From his early youth, he had a keen interest in forest zoology. However, his stepfather (P.N. Spessivtseff, the well-known entomologist) wanted to foster multiple skills and interests in his stepson. This made the choice of his career difficult and uncertain, especially with respect to arts and literature. The decisive event was the zoological expeditions to forests of the Urals and Sayan Mountains in 1917, where he worked as a collector of bark beetles. He also collected bark beetles when he was a student at the Institute of Zoology at Eberswalde, where he studied under the leadership of K. Eckstein.

One of the outputs of his hard work was the thesis on the morphology and systematics of Palearctic sap beetles. In Eberswalde, he became engaged in investigations of soil fauna when he worked as an assistant, designated for both teaching and research[100] (Eidmann 1966). One of his early studies was related to identification of larvae in pine forests near Brandenburg (Butovitsch 1933). Later, he conducted studies of long-horn beetles (*Cerambycidae*) and other insects (Butovitsch 1939-1963). In the 1930s, he started to collaborate with the Entomology Unit of the Swedish Forest Research Institute under the leadership of Professor Ivar Trägårdh; the collaboration was fruitful. Ivar Trägårdh and Butovitsch co-authored a number of publications in scientific journals. An important part of the collaboration was protection of forests, in particular, studies to assess consequences of hurricanes (for more information, see the two papers: Trägårdh, Butovitsch 1935a, b). In addition to the work in the Research Institute, Dr. Butovitsch began to teach at the Royal Forest College in Stockholm. Later, in 1962, he was appointed Director of the Institute of Entomology at the Royal Forest College in Stockholm (Eidmann 1966). He participated in the IUFRO Congress in 1953.

It is also noteworthy that upon adoption of the new Statutes and accession of new members, the Union changed its club-wise management to a collective leadership model for the benefit of its member-organizations. In 1929, soon after the USA's accession to the Union, the English language became the third official language of the Union.

[100] According to П.Е.Ковалевский (1973, p. 136), Professor V.A. Butovitsch was an agronomist.

Chapter 12
Congress VIII – September 4-11, 1932, Nancy, France

Information for this Chapter was mainly taken from the Proceedings of the 8th Congress of the International Union of Forest Research Organisations, printed in 1933 in Nancy by the Berger-Levro Printing House (IUFRO 1932), as well as from an article of a Congress participant (Guillebaud 1932).

Overview

The 8th Congress brought together 84 delegates (4 of them accompanied by their spouses) from 33 countries. As usual, the largest delegation was that of the host country (France): 21 delegates, including 2 participants from Algeria and Morocco. The largest foreign delegation was that from the British Empire, which included 14 delegates from: the United Kingdom (5), India (3), Australia, Canada, Nigeria, Uganda, Cyprus and Palestine. Czechoslovakia was represented by 5 participants; Spain sent 4 persons; and Hungary, Denmark, Germany, Poland, the USA, Switzerland and Japan were represented by 3 persons each. It should be also mentioned that there were no Austrian representatives in the List of Participants (IUFRO 1932).

The agenda included 7 meetings and 64 papers for discussion. The participants were offered five excursion routes: pre-Congress (# 1, August 21 - September 3, 1932), during the Congress near Nancy (# 2, September 6, 1932, and # 3, September 8, 1932), and after the Congress (# 4, September 11-18, 1932). The Congress lasted four weeks: from August 21 to September 18, 1932.

Scientific program

The official opening ceremony took place on Monday, September 5, 1932, at 10:00 a.m. at the Town Hall. The session was chaired by Mr. Fortunet, Inspector General of Forestry, who was delegated to the Congress by the Minister of Agriculture. Mr. Fortunet delivered his welcoming speech. He said that there were both uneducated and, unfortunately, educated people who were not aware of the value of forests. “People are surprised by the existence of forest. ‘Trees, they say, are growing on their own and need no help from us.’ These people, with obviously superficial minds, are surprised with the fact that it is necessary to have forest specialists to ensure rational use of forests. Still, they would be even more surprised if they knew that it is necessary to have scholars. That is why, Ladies and Gentlemen, I deem the very existence of the International Union of Forest Research Organizations and its Congresses to be of the highest importance” (IUFRO 1932, p. 739). He compared foresters with artists and musicians because a perfect forest was a masterpiece. Mr. Fortunet said that to advance the science was the aim of that gathering there in the old and noble city of Nancy which was sort of a holy city for French foresters! He declared the Congress open (IUFRO 1932, p. 740).

Then, the Mayor of the City welcomed the participants and said that the city had the honour to host the Congress thanks to the National School of Forestry and its famous leader, Mr. Guinier, President of the Union.

Professor Ph. Guinier, Director of the National School of Forestry and Research Station welcomed the delegates of the Congress and told them about the history of the French forest science,

dating back to the seventeenth century. He said: “It was born in the forests of Central France… Thanks to the action of those who succeeded in forestry education since the opening of the School in 1824, thanks to the efforts of many generations of students who were trained here, the French forestry practices have been developed and adapted to different types of forests. Besides the treatment of existing forests, French foresters are addressing special tasks, such as dune fixation and especially restoration of the mountains. Everything that you see in France in forestry is a collective output from the work French teachers, scientists, and practitioners… And though this work is not highlighted in numerous publications and bulky didactic treatises, it is written in the field, in our forests. ‘*Plus faire que dire*’[101] is the motto of French forestry...” (IUFRO 1932, p. 741).

Then, the President spoke about the work done; he expressed regrets at the inability of Professor Hesselman, Director of the Swedish Forest Experiment Station, to attend the Congress due to illness, and noted that many participants remembered the success of the Congress in Stockholm. The Stockholm Congress was held at a time when changes in forest science seemed necessary, when the worldwide problems of forestry proved to be increasingly important and sometimes alarming. Forest science came as an aid, and the last two decades saw notable progress in the field of natural sciences. Many research areas in plant life, ecology, soil science emerged. This movement was intense; the awareness of the value of forests and need for forest research and rational use had been rising.

Forest issues were of interest for a wide audience, including forest practitioners who managed forests, municipalities and private forest owners, timber merchants and industrialists, as well as other people who saw the forest from the perspective of tourism and hunting. All of them were friends of the forest, whose support could be effective (*ibid.*, p.743). In order to coordinate their actions, different countries organized international forest congresses to discuss not only forestry issues, but also matters of concern for forest owners, timber merchants, wood-workers.

For example, the International Institute of Agriculture in Rome organized the Forestry Congress in 1926, and took steps to hold regular international meetings and suggested combining such Congresses with other organizations. Many forest institutions and prominent foresters supported the idea. Thus, it was not impossible for such a gathering to follow or precede the Congress of the Union, and it might be possible to organize joint excursions. The speaker also stated that IUFRO could lead the international forestry movement and everyone could benefit from the expansion of its scope, as progress of forest science was related not only to individual countries but to all mankind. He said: “This idea should dominate in our discussions, and it is a sure sign of the success of our efforts” (IUFRO 1932, p. 747). As noted in the report, it was, like all the previous ones, immediately translated into the German and English languages.

Vice-President of the Union Gyula Roth (Hungary) made a speech on behalf of the foreign delegates and thanked the Congress organizers. He started to read his short address in French, and then switched into German and completed it in English.

IUFRO Secretary General Professor Sven Petrini (Sweden) reported on the development of the Union since 1929, also in the three languages: French, German, and English. He noted that over the past three years the number of its members had significantly increased: more than 90 institutions were permanent members and three men were associate members. He listed the names of some of the institutions, such as the Ministry of Agriculture of the Argentina, the University of Thessaloniki (Greece), 14 federal Forest Experiment Stations of the United States in Washington, Pennsylvania, North Carolina, California, Ohio, Utah, Minnesota, Massachusetts, Montana, Oregon, Louisiana, Arizona, Wisconsin and Colorado.

[101] What else can be said.

He also described achievements which were conveyed to the members through circulars and individual correspondence. The first steps had been made to put in place a system of international trade in forest seeds of known origin. A special grant had been offered as an incentive for the Bibliographic Committee. An opportunity to edit forest dictionaries in several languages had been explored. In addition, the Union financial situation had improved: as of August 1932, the cash balance had amounted to CHF 10,629, and the year-end balance would be likely from six to seven thousand Francs.

Then, the President read out the agenda of the meetings in six sections (IUFRO 1932, Guillebaud 1932):

1. Forest Ecology and Silviculture;
2. Forest Utilization;
3. Tropical and Mediterranean Forest Problems;
4. Re-afforestation on High and Low Lands;
5. Pedological and Climatological Forestry;
6. Forest Preservation.

Section 1: *Forest Ecology and Silviculture* considered the following four key issues:

Study on the methods used in forest research. The reports covered a wide range of inventory and measurements methods used in many countries, including Germany, Austria, the United States, Finland, France, Poland, Canada, Belgium, Netherlands India, and Nigeria. During the discussion, it became apparent that the Congress became difficult to manage and it was also difficult to effectively discuss the issues with many particularities. It was decided to establish a small group (Fabricius from Germany, Oudin from France and Guillebaud from the UK), which examined and compared several possible methods, used by different experimental stations, with the aim of drawing up agreed best (at least in theory) methods.

Standardization of description of stands and localities. This issue had been raised at the Congress in Stockholm. After the presentation of papers from Denmark, India, Czechoslovakia, and Italy, the following decisions were made: 1) Two schemes developed by, respectively, Mr. Kvapil (Czechoslovakia) for temperate and cold regions, and Professor Pavari (Italy) for the Mediterranean region should be supplemented by the scheme to be presented by the Institute of Dehradun (India) for tropical regions. 2) These three schemes should be directed to the Permanent Committee of the Union for distribution, and to all forest research organizations, upon approval.

Hunting and National Parks. There were only two reports about relationship between silviculture and game management (Czechoslovakia) and the importance of national parks for silviculture (Poland). Professors Jedlinski (Poland) and Korstian (USA) were commissioned to finalize the text of the recommendations for submission to the Plenary.

Origin and testing of forest tree seeds. The representatives of the USA, the Netherlands and Czechoslovakia presented papers for discussion. Concerning the origin of seeds, the Congress articulated its recommendations as follows: (1) Forest Experiment Stations should continue to exchange seeds for research purposes via the Union Secretary General; 2) The governments, while maintaining complete freedom in the organization of control in their states should adopt international standards to ensure the origin and control of seeds. According to the methods of testing for tree seeds, the Congress recommended holding a symposium at the next meeting, where each country should briefly describe the best methods of seed testing, used in the country along with suggestions that the country could or would like to make in order to enhance the effectiveness of the methods in use.

Various subjects. There were many presentations about standardization for comparability of thinning sample plots (Netherlands), dendrometry (Poland), revegetation of hornbeam (Latvia), physical and chemical properties of leaves (USA), revenue in forestry (Denmark), imports of trees from Asia (France), natural regeneration (Hungary), and forest yield (USA).

Section 2: *Forest Utilization*[102] paid attention to such issues as properties of wood (Japan), resin production (Spain), resin taping (Yugoslavia), and X-Ray investigation of the quality of the woods (Hungary). The Section made the following decisions, which were adopted by the Congress on wood tapping, keeping in mind that tapping of pine trees was of great economic importance. Taking into account that the issue was scientifically complex, the Congress drew attention of the governments interested in topics related to resin tapping, to the desirability of prioritization of research, or at least of organization of such studies by the Forest Research Organizations alongside with practical work on tapping. The Congress recommended that: a) upon consultation with the organizations, the Permanent Committee should examine and compare the methods of research, aiming at designing uniform rules for research; and b) the achieved should be shared through submitting the reports, prepared by technical specialists.

Testing of wood properties. There was a great diversity of methods used to test physical and mechanical properties of wood. To streamline comparisons of results of experiments conducted in different laboratories, the Congress recommended: a) exploring possibilities for unification of methods and presentation of results in numerical form in different research institutions of the Union; and b) discussing the issue at the Congress in 1936 to obtain standardized procedures.

Section 3: *Tropical and Mediterranean Forest Problems* discussed various papers, dealing with topics such as resistance of timber to attacks of Shipworms and root competition in Teak (*Tectona grandis*) forests (Netherlands India), Moroccan tree species, tree immunity to the parasitic insects (France), erosion control with dry stone walls in Cyprus. The Session drafted recommendations to the Congress, advising the Forest Experiment Stations from different regions to focus their research on the morphology, physiology and ecology of the root systems of species that form the main types of forest vegetation, especially in arid, subtropical and tropical regions.

Section 4: *Reaforestation on High and Low Lands* concentrated on reforestation and prevention of erosion in the mountains. The topics included: new methods of planting in sand dunes (Netherlands), vegetation of *Abies grandis*, weed control and afforestation of heaths (Belgium), use of nitrogen fertilizers in nurseries (Czechoslovakia), and reforestation of a wind-blown plain in a drift-sand area (Denmark). This Section adopted no resolution.

Section 5: *Pedological and Climatological Forestry* discussed soil science and climatology – specifically, on humus and mechanical and chemical treatment of podsols (Denmark), on regeneration of podzolized forest soils (Czechoslovakia), on classification of humus forms (Germany), on acidity of soils, and on the directions in the local research of *Phosphorus pentoxide* in forest soils (Hungary). For instance, Dr. Bornebusch (Denmark) proposed an international scheme for describing the humus layers in the forest. He described two main types of humus: raw humus (mor), consisting of two layers (upper – fermentation layer, and lower one – humified layer with its tree subtypes: fine, greasy and fibrous humus), and mull, with its two subtypes: true mull and superficial mull. “Dr. Bornebush’s classification and terminology were adopted by the Congress.” (Guillbaud 1932, p. 168).

Section 6: *Forest Preservation*[103] received two discussion papers on resistance of forests to insect attacks (Switzerland) and forest entomology in the country (Netherlands India). This Section adopted no resolution.

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[102] *Forest Utilization = Forstbenutzung* – in the German version of the Congress Report (IUFRO 1932, p. XII) and *Forest technology = Technologie forestière* – in the French version (IUFRO 1932, p. XXVI).
[103] *Forest Protection = Protection of Forest =Protection des Forets* – in French version (IUFRO 1932, p. XXVII) and *Forstschutz* – in German version of the Congress Report (IUFRO 1932, p. XIII).

Organizational matters

On the eve of the Congress, on Sunday, September 4, 1932, at 3:00 p.m., the International Committee held its first meeting in the National School of Forestry at Nancy. According to the Statutes of the Union, the International Committee consisted of representatives of the countries with at least one Research Institute. The President of the Union welcomed the delegates and listed the Members of the International Committee members, 23 of whom were present at the meeting (Professor H. Hesselman was absent due to illness and sent his excuses).

The President also read Article 6 of the Statutes about the duties of the Committee and its Members.

Upon approval of the agenda, Chairmen and their Deputies[104] were elected for two Sections: Stoklasa (Czechoslovakia) was elected Chairman for Section 1 *Forest Ecology and Silviculture*, and Guillebaud (Great Britain) and Poskin (Belgium) were elected his Deputies. The Section would discuss the methods adopted by the forest research stations. De Peyerimhoff (France) was elected Chairman for Section 3 *The Tropical and Mediterranean Forest Problems*, and Unwin (Cyprus) and Nakayama (Japan) were elected his Deputies.

It was necessary to decide who would chair the Committee on Bibliography because its Chairman Professor Oppermann had died. The meeting expressed different views on the principles of the Committee formation. The President proposed to elect Mr. Bornebush (Denmark) to take the function of the Chairman of the Committee on Bibliography to replace Professor Oppermann.

The second session of the International Committee was held on Monday, September 5, 1932 at 5:00 p.m. under the chairmanship of President Guinier (France). The Committee approved the candidates to become leaders of the Section on the *Study of Methods of Forestry Research* (K. Woodward from the USA became its Chairman; and Hausbrandt from Poland and Duscheck from Czechoslovakia became his Deputies) and the Section on *Forest Technology* (Troup from Great Britain became its Chairman and Flury from Switzerland and Oshawa from Japan became his Deputies). For this reason, Troup and Flury left the Committee on Bibliography. Mr. Géneau (France) was appointed Acting Chairman of this Committee.

Professor Gyula Roth from Hungary was elected President of the Union (1933-1936), and it was decided that Hungary would host the next Congress in 1936. Professor Roth proposed to hold Congresses less often than every 3 years as the American colleagues suggested, and taking into consideration that the Statutes of the Union specified an interval of 3-5 years. In addition, he suggested that the outgoing President of the Union should remain on the Permanent Committee as its honorary member. The American delegation (Korstian) supported both proposals. It was decided to draft amendments to Article 7 of the Statutes to reflect a proposal about Ex-Presidents and increase the interval between Congresses.

Mr. Badoux (Switzerland) spoke in favour of the possibility of the IUFRO Congresses to be held in cooperation with the International Forestry Congresses[105], and Mr. Pavari (Italy) said that he had talked about it with the President of IIA (International Institute of Agriculture) in Rome, and he confirmed the IIA's intention to make arrangements for the Forestry Congress about the same time as the IUFRO Congress.

Further, the Committee considered and approved the financial report.

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[104] In the Congress Report, these positions are mentioned as President and Vice-Presidents (IUFRO 1932, p. 823). To avoid misunderstanding, here and further on, the leaders of the Sections will referred to as the Chairman and the Deputy.

[105] Now it is the World Forestry Congress (WFC).

The session decided to hold the next Congress in Budapest (Hungary) in 1936.

The third session was held on Wednesday, September 7, 1932, at 5:00 p.m.

The meeting approved the changes in the Statutes on the outgoing President status, the workplan of the Commission on Forest Bibliography, and the draft resolution on this issue, as well as research methods. The Draft Resolution on the Committee on Forest Bibliography read as follows: "In accordance with the proposals of the Committee on Forest Bibliography, the Congress invites each country to nominate some person or institution to undertake the preparation of references to all current forest literature published in that country and to exchange them for similar references prepared in other countries. Reference is invited to the procedure proposed by the Committee on Forest Bibliography, which is recommended for general adoption" (IUFRO 1932, p. 827).

After the discussion, the President read the recommendation of the Section on the unification of methods of forest research: "The first section, having heard the reports presented by different delegates concerning the organisation of forest research in Germany, England, Austria, the United States of America, Finland, France, Poland and Czechoslovakia, decides to submit to the International Committee the question of appointing one or more commissions in charge of presenting a joint report" (*ibid.*, p. 827).

The President reminded the meeting that the Commission on Research Methods consisted of nine members, appointed on July 16, 1930 at a meeting in Zurich, and that all members were asked to submit their reports. The members provided the reports with the exception of Kobranoff (USSR) and Petterson (Sweden). After the discussion, the meeting adopted the proposal to establish a group of three members for drafting a consolidated report.

Then, the participants talked about international forest congresses, and, in particular, about the possibility to hold jointed Congresses of IUFRO with other forest organizations. Such an idea had been put forward by the International Institute of Agriculture in May, 1930. It was now time to take a decision, first on the general principle: Was the Union keen to hold its Congress (in strictly conformity with its Statutes) in the same place and at the same time of another international congress on forestry (with a wider scope of activities)?

Mr. Badoux (Switzerland) referred to the words of Dr. Michaelis at the International Forestry Congress in Rome in 1926, who declared that although the International Bureau of Agriculture[106] would be in charge of convening the international congresses on forestry, the International Union of Forest Research Organizations would nevertheless continue to have the right to organize its own congresses. Mr. Roth (Hungary) was in favour of asking the International Institute to hold its congress also in 1936 and, if possible, in the same region as the Union Congress. Mr. Fabricius (Germany) was of the opinion that this proposal should be accepted, but only as an experiment. Mr. Kontos (Greece) was of the same opinion.

The President asked whether the Committee deemed it possible that a Congress of the Union and an International Forestry Congress be practically held in the same place, or in any case in the same country, at close intervals, contingent on the full independence of the Union.

The proposal was put to the vote and was adopted. But the President stressed that it would necessary to work out response options to avoid ambiguity (IUFRO 1931, p. 828).

The fourth session took place on September 9, 1932 at 2:30 p.m. It started with the following two questions: membership of the Permanent Committee where two seats were vacant. Upon discussion, it was decided to include a representative from the United States with its rapidly developing forest science and many organizations which had joined the Union, as well as representatives from countries of Central and Northern Europe. Mr. Munns (USA) and Mr. Ilvessalo

[106] International Institute of Agriculture (IIA).

(Finland) were appointed to the Permanent Committee. On the motion of Sir R.L. Robinson (Great Britain), Mr. Munns was unanimously elected Vice-President of the Union. Mr. Jedlinski (Poland) was unanimously elected Member of the Committee for Bibliography.

The International Committee discussed the proposals from specific Sections, pertaining to: unification of forest research methods, control and testing of seeds, national parks and forest reservations, description of locality, protection of pheasants, production of resin, wood tests, study of root systems, nomenclature of humus layers, study of podzolic soils, and bibliographic notices.

The importance of studies on podzolic soils was stressed, and Mr. Dramba (Romania) pointed out to the importance of such research for Eastern Europe. He asked to include it in the agenda for the next Congress and to invite a delegate from Russia to report because Russian research had well advanced in that field (*ibid.*, p. 834).

In conclusion, the meeting addressed several miscellaneous matters such as working methods (timeframes and formats for reports, division of sections, and if the workload became excessive), possibility of subsidizing the *Forstliche Rundschau* (Forestry Review) in the amount of DM 3,000 per year, as well as who would speak at the plenary session. Then, the President and Mr. Badoux expressed gratitude on behalf of the International Committee, and the meeting closed at 6:30 p.m.

Next year, in 1933, the first meeting of the Permanent Committee was held in Grafrath, to the west of Munich. Then, two more meetings were held in 1934 in Sopron and Balaton, and in 1935, other two meetings were convened in Florence and Rome to address routine issues and the program for the next Congress.

Resolutions

According to the Congress Report, the International Committee and the Congress adopted the following decisions/resolutions (IUFRO 1932, pp. 848-850):

> "A) Matters of Organization and Management (Decisions of the International Committee)
>
> *Next Congress:* The next Congress will be held in Hungary, in 1936.
>
> *International Forestry Congresses:* Subject to the express-reservation that the Union shall retain its entire independence, the Committee approves the suggestion that as an experiment, the Congress of the Union and an International Congress of Forestry should be held in the same town, or in any case in the same country, at proximate dates. This measure will be applied, in agreement with the International Institute of Agriculture of Rome in 1936.
>
> *Amendment to the Statutes:* The membership of the Permanent Committee is increased to 8 - the retiring President remaining by right a member of the Permanent Committee until the 31st of December following the next Congress.
>
> *Permanent Committee* for the period January 1, 1933 to December 31, 1936: President: Mr. Roth (Hungary); Vice-President: Mr. Munns (United States); Members: Messrs. Fabricius (Germany); Sir Roy Robinson (Great Britain); Guinier (France); Ilvessalo (Finland); Badoux (Switzerland); Pavari (Italy).
>
> *Commission for the study of the unification of description of forest stands and of methods of forest research:* The International Committee decided to appoint one commission of three members: Messrs. Fabricius (Germany); Guillebaud (Great Britain); Oudin (France).

Commission for the study of podsolized soils: In view of the importance of studying podsolized soils, especially those which have a layer of hard pan and in view of the utility of finding most suitable methods for assuring its cultivation, the International Committee proposed the appointment of a Commission to make a special study of this question. The following were selected by the International Committee to serve on the Commission: Messrs. We1s (Denmark), President: Nemec (Czechoslovakia); Oudin (France); Albert (Germany); Lang (Germany); Guillebaud (Great Britain); Geerling (Holland); Kirsteins (Latvia); Tamm (Sweden); Romell (United States of America); Vilinsky (U.R.S.S.)[107].

This proposition was adopted unanimously.

Bibliographical Committee: The Bibliographical Committee, for the period 1933-1936, is composed of: Messrs. Weber (Germany); Troup (Great Britain); Perren (France); Jedlinski (Poland); Flury (Switzerland).

International bibliography: The Bibliographical Committee proposed one resolution and a recommendation, which the International Committee adopted at its meeting on September 7, 1932 (...)

B) Scientific Forestry Questions (Resolutions of the Congress)

Section 1: Forest Ecology and Silviculture

Description of locality: The Congress proposed that the two plans worked out by Mr. Kvapil for temperate and cold regions and by Mr. Pavari for the Mediterranean region, be completed by the scheme which is to be presented by the Dehra-Dun Institute (India) for the tropical region. The three schemes when approved by the Permanent Committee of the Union shall be distributed to all the Forest Research Organizations. The proposition was adopted unanimously.

Origin of forest tree seeds: The Congress proposed that the Research Stations continue to exchange seeds for scientific purposes through the Secretariat General of the Union;

The Governments, while retaining entire liberty in the matter of organising control in their respective countries, shall be requested to adopt international standards for guaranteeing the control and origin of seeds. The proposition was adopted.

Methods of testing forest tree seeds: As regards methods of testing forest tree seeds, the Committee adopted the recommendation made by the 1st Section, reading as follows:

'It is recommended that the International Committee consider the advisability of holding a symposium at the next Congress, in which each country or State would briefly describe the best methods of testing forest tree seeds used in that country, together with such suggestions as the country might desire to make as to the effectiveness of the methods employed. It might be desirable to have the various nations prepare short statements to be circulated before the assembling of the Congress among the other nations for consideration and comment. At the following session of the Congress the question of the development of uniform seed-testing methods could then be thoroughly considered'.

National parks and forest reservations: Biologists generally recognize the importance of virgin and natural forest stands for the study of the laws of the natural evolution of vegetation types. It is recommended that the Union uses its influence with governments to assure the conservation or reservation of an adequate number of natural stands in the different types of forest and in the various countries of the world to help such studies. In particular, it

[107] The correct name is Vilenskiy. Dmitry Germogenovich Vilenskiy (1892 - 1960) was a soil scientist, Doctor of Geological and Mineralogical Sciences; he did not participate in the Congress.

would be of interest to determine scientifically the processes of nature in restoring forest lands, destroyed by fires or other calamities.

Breeding of Pheasants: Since this question is outside the normal scope of forest research, the Congress decided not to adopt the proposition.

Section 2: Forest utilization

Production of resin: The Congress recommended that after consultation with the organizations concerned, the Permanent Committee study and compare methods of investigation for the purpose of drawing up uniform rules for research. Communication of results obtained shall be facilitated by the exchange of reports made by technicians.

Wood tests: The Congress recommended that the matter of unification of methods and numerical presentation of the results be made a subject of studies in the various research organizations of the Union. This matter is to be submitted for discussion to the 1936 Congress in order to obtain standardized methods".

Excursions

The participants of each excursion received a detailed itinerary and comprehensive instructions, including a map, description (in German, English and French) of the geology, climate, vegetation and other information. For each demonstration site, a detailed description was provided, including the growing stock per hectare, productivity, and wood marked for cutting. (IUFRO 1932). In fact, the Congress began in Rouen, where the pre-Congress tour started. Then, the route went via Paris, Orleans (Les Barres), Tours, Bordeaux, Carcassonne, Marseille, Lyon and Briancon to Nancy. The participants arrived at Nancy on September 4, 1932. The two in-Congress tours (on September 6 and 8, 1932) were organized around Nancy between the sessions of the Sections. The eight-day post-Congress study tour was organized through the French Alps.

Study tour 1 (Pre-Congress tour): The Mediterranean Region. August 21 - September 3, 1932. (Leaders: Professor Guinier, Oudin, Schaffeer, Hulin). The main aim of the excursion was to give an overview of different forest site conditions, types of vegetation and treatment of forests in France. The tour started in Rouen, the ancient capital of Normandy, a city rich in historical and ancient monuments, where participants gathered on August 21, 1932.

On the first two days, the group visited beech stands (*Fagus sylvatica*) in the d'Eawy State Forest and Scots pine (*Pinus sylvestris*) stands in the Roumare Forest District in the Lower Seine. Both of the forests were growing on flint clay soils, often of a very large thickness, but the proportion of sand in Roumare was greater. In 1924 and 1926, the Forest Experiment Station had established two experimental plots to study methods of thinning, regeneration, growth and yield of stands during the final years of their existence.

On August 23, 1932, in the afternoon, the participants took a train to Rouen-Paris, and then dined and slept in Paris.

On August 24, they departed by train and then travelled by bus to the Forest School, where Director Parde offered them a quick tour in Arboretum and Fruticetum with their particularly rich and interesting collections. After a bus trip to Blois, the participants spent next two days there.

The day of 25 August was devoted to the Sologne (la Sologne) to see artificial reforestation of the Scots pine, Maritime pine, Black pine, Corsican black pine (*Pinus sylvestris, P. pinaster, P. laricio corsicana*) and other species. In this region, two very large-scale reforestation efforts were undertaken: first in 1858, when the Sologne Central Agricultural Committee was established and in subsequent years, and again after the terrible winter of 1879-1880, which destroyed a large part of young stands. As of the time of the Congress, forests covered 150,000 ha, about a third of the area

of this region. During the day, the delegation visited the Castle of Chambord (*Château de Chambord*), Cour Cheverny, where the Chief Huntsman showed them a pack of dogs (most often used in France for deer hunting).

In the morning of August 26, 1932, the excursion participants visited the forest of Blois to see the sessile oak (*Quercus sessiliflora*) there. They drove through magnificent forests of the township, plantations and saw very dense almost pure oak thickets, divided into squares for experiments. The Research Station had established the sample plots in the stands of 30-150 and more years old to experiment with various modes of thinning, restoration and production during the final years of their existence. In the afternoon, they travelled by train (with dinner on board) to reach Bordeaux by night.

On the next day, August 27, 1932, the participants visited the forest of Lacanau and the sample plots established there by the Research Station for tapping experiments. In the afternoon, a small forest railway train brought the delegates to the Grandmont Crossing and they visited the State forests in the municipalities of Lacanau, Carcans and Hourtin. The group grew acquainted with a planting of maritime pine (*Pinus pinaster*), its age distribution, appearance of each division, thinning methods, and tapping. On Sunday, August 28, 1932, they had leisure time and walked in Bordeaux.

The next two days (August 29-30, 1932) were used to explore the forests of the foothills and the eastern part of the Pyrenees with their silver fir (*Abies alba*), Scots pine (*Pinus sylvestris*) and Pyrenean mountain pine (*P. uncinata*). Fir trees occurred in the western part of the Corbières in pure and mixed forests with beech at an altitude of 750-800 m.

Driving by bus through the valley of the Aude, the participants could see the communal forest of the Mathe des Angles with its magnificent Scots pine trees. The Pyrenean mountain pine forests of the Eastern Pyrenees grew at an altitude up to 1,600-2,000 m; they were pure stands with an average diameter of 30-35 cm and a height of 10-12 m. The group stopped in the forest of Font-Romeu and communal forest where the Bolquère Research Station had several testing sites, and then came down to Perpignan, where took a train to Marseille for dinner and overnight.

The next day, August 31, 1932, the delegates went to look at the vegetation of the French Mediterranean region, in particular, the Aleppo pine (*Pinus halepensis*), holm oak (*Quercus ilex*), and downy oak (*Quercus lanuginosa*). In addition, the tour participants were informed about fire management arrangements. In the afternoon, the group visited the forest of the Sainte-Baume, located at an altitude of 1,000 m. They saw a genuine natural forest, reverenced for centuries and, including the main types of the Mediterranean vegetation. In this very interesting island of 138 ha the predominant species were the yew (*Taxus bocatta*), beech (*Fagus sylvatica*), maple (*Acer opulifolium*), big-leaf linden (*Tilia platyphyllos*), rowan rotundifolia (*Sorbus aria*), and wild service tree or the chequer tree (*S. torminalis*).

The following days were spent in mountain forests with a quick visit to a site of mountain land restoration. After visiting the famous the Gorges du Verdon, the group went to the Castellane, Saint-André-des-Alpes where they had lunch in the canton of the d'Allos-Colmars. In the early afternoon, a good storm enabled the visitors to appreciate, first hand, the intensity of summer rainfall and the importance of surface runoff on denuded slopes. During one of the stops at an altitude of 2,250 m, they enjoyed a picturesque view of mountains 3,000-3,400 m high; then they went for a walk through the alpine meadows. Dinner and bed were organized in Barcelonnette (1,130 m a.s.l.).

On September 2, 1932, the most enthusiastic delegates (and there were many of them) woke up at 5:00 a.m. to arrive at the torrent at Bourget by 8:30 a.m. The rest of the group arrived there by coach via Saint-Paul-en-Ubaye, Col de Vars (2,115 m above sea level), Mount Dolphin, Briançon, and Montgenèvre, where they visited a forest with dominating European larch (*Larix decidua)* trees. The participants could see the meteorological devices, sample plots and demonstration sites of the

Research Station. During the dinner, Dr. Fr. A. Weis (Denmark) spoke on behalf of his foreign colleagues with great cordiality; he expressed thanks to the organizers who had made the travellers feel 'like the royalty': 'always in the 1st class', and 'across the country that is also the 1st class' (IUFRO 1932, p. 864).

On Saturday, September 3, 1932, participants arrived in Nancy after the 15 days of a "tour de France".

Route 2. In-Congress tour: The Forest of the Haye. Tuesday, September 6, 1932, afternoon. (Leader: Professor Perren). Main idea of the excursion was to show coppice forests and their conversion into high forests.

The Forest of the Haye covered an area of 8,000 ha (including 6,444 ha of state-owned forests), located to the west of Nancy, at an altitude of 300 to 400 m, and crossed with pretty deep valleys. The soil consisted of limestone rocks of the Middle Jurassic with its decomposition giving insufficient thickness of the red soil, but making it fertile enough; and in some areas, it included quaternary alluvium (silt trays), generating deep soil of a good quality. The main tree species were the beech, oak, hornbeam, oak, and ash. Until 1832, the entire forest was exploited as coppice at a rotation age of 15-25 years. The conversion to a high forest had started in 1832. Since 1850, about 5,000 ha were converted in 8 series; the rest was divided into 7 series of coppice, exploited under the 35-year cycle.

The delegates visited several parcels of coppice, and then Professor Perren explained to the group the reconstruction method – the conversion of coppice to high forest. He also showed the continuity cuttings: preparatory cuts, seeding cuts, regeneration felling, and finally – improvement cuts at the pole stage.

Route 3. In-Congress tour: Forest of the Ban Etival, Vosges. Thursday, September 8, 1932. (Leader: A. Oudin). The delegates visited old growth forests (140-170 years old) of the Scots pine where strip (regeneration) cutting operations had commenced in 1926. The charts demonstrated the results of 50 year experiments of the Forest Experiment Station at Nancy to estimate the yield in the Vosges selective forest. In the afternoon, the group visited three series of forests, assigned to the National School of Forestry. Under the direction of Mr. Oudin, delegates visited several plots in each series and could see that the stands, despite the diversity of capacity estimation methods had very similar characteristics. The data were presented for each of the three demonstration sites in the form of indicators calculated per ha for each forest inventory period of 10 years. Starting with the data for 1886, the results of the research had been published shortly before the IUFRO Congress by L.Schaeffer (L.Schaeffer, Sur trois modes de calcul de la possibilité des futaies fardinées in Annales de l 'École Nationale des Eaux et Forêts, t. IV, fasc. I, 1931).

Route 4. Post-Congress Tour: Mediterranean forests. September 11-18, 1932 (Leaders: Professor Flahault, University of Montpellier, Mr. Hickel, President of Silva Mediterranea and Professor Guinier). The group, consisting of delegates and those who did not participate in the Congress, met on September 11, 1932, in Avignon. Most of the non-Congress participants were from the Silva Mediterranean Society, who had gathered for their biannual meeting, which coincided with the excursion. The delegates of the Congress said that this route was "botanical rather than silvicultural, involving a demonstration of the zonation of forest types with increasing elevation" (Guillebaud 1932, p. 169).

On September 12, 1932, the participants visited the first site near Avignon in the vicinity of the Mount Ventoux (Mont Ventoux, 1,900 m above sea level), and got acquainted with five clearly distinguishable areas:

- Upper Mediterranean, 400-670 m, *Quercus ilex.*
- Low Mountain (Basses Montagnes), 670-1,300 m, *Quercus lanuginosa.*
- Mountain, 1,300-1,500 m, Beech.
- Sub-alpine, 1,500-1,800 m, *Pinus uncinata.*
- Alpine, above 1,800 m, Alpine herb flora.

The lower limit of the beech range might be closely associated with the lower level of fog that often covered the higher part of the mountain during spring and summer months. The original forest cover was almost completely destroyed by the local population's overgrazing, and in the last 100 years, most of the mountain (670 m high) was described as devoid of forest vegetation. Active reforestation measures had been taken since 1860, and a total area of reforestation reached 4,500 ha. Natural forests (5,300 ha) regenerated naturally.

The main species, used for reforestation, were the Holm oak (*Quercus ilex*) and Downy oak (*Q. Lanuginosa* or *Q.pubescens*) which was considered by some botanists to be a subspecies of the Holm oak (*Q. sessiliflora*), but with other habitats and growth rates. Each type of oak was planted in a separate plot. The following conifers were identified: the Untsinata pine (*Pinus uncinata)*, a species close to the Mountain pine (*P. mugo*) in forest plantations, produced through direct sowing; as well as the Maritime pine, Aleppo pine, Austrian pine and Atlantic cedar.

On September 13-14, 1932, the second excursion led to the Mount Elgon (Mont Aigoual, 1567 m), located on the southern top of the Cévennes mountain range and consisting mainly of granitic rocks and metamorphic schists. The natural zoning of the area was the same as that of the Mount Ventoux. By the middle of the nineteenth century, excessive mining in combination with goat grazing had resulted into deforestation of a large part of the mountain. Reforestation had begun in 1860 on a modest scale, but in 1882, the State had bought nearly 35,000 ha of the forest and initiated a large-scale forest planting.

On September 15, 1932, the participants visited the dry limestone foothills above Toulon, where the Forest of Ollioules was demonstrated as an example of the Lower Mediterranean zone, which was characterized by dwarf oak (*Quercus coccifera*) and Aleppo pine (*Pinus halepensis*) plantations. There, reforestation was hampered due to the rocky soil surface, frequent fires, as well as the trend of dwarf oak invasion. The latter of these took place when its stands became too dense, preventing natural regeneration of the Aleppo pine. The participants also visited the State forest of Montreux in the upper valley of the Gapeau. The forest was located at an altitude of 180 to 750 m. The soil was highly fragmented and consisted partly of sand and calcareous clay loams. It was of good quality and favourable for tree growth.

On September 16, 1932, the fourth excursion demonstrated the Massif de l'Esterel, located to the north of St. Raphael. The Esterel consisted of alternating hills and valleys. The dominant tree vegetation sprawling over 5,600 ha was represented by the maritime pine, cork oak and a small inclusion of the Aleppo pine and holm oak. The plantations were destroyed or damaged due to frequent fires, especially during the war. In 1918, for instance, over 80% of the forest area was lost to a fire from a military camp in the forest. Catastrophic fires were caused by: the resinous pinewood, dense shrubs in the undergrowth, and high summer temperatures with prevailing strong dry winds during fire seasons.

The last sites were visited on September 17, 1932; they were communal forests of the Escarene and of the Col de Braus in the Maritime Alps to the north of Nice and communal forest Eze between Nice and Menton. This area differed from Provence: it had higher rainfall rates with no dry mistral winds, which were largely deflected by the hills of the Esterel mountain range. These two facts explained the abundance of vegetation and, in particular, the presence of species such as the European hop hornbeam (*Ostrya carpinifolia*) and manna ash (*Fraxinus ornus*) in the western

limit of their natural range. The delegates also saw some examples of flood prevention and reforestation efforts on steep denuded valleys of Paillon and Carei. The reforestation operations were highly expensive: "Expenditure rang[ed] from £10 to £44 per acre[108], but in general they had succeeded in preventing disastrous floods with consequent damage to property. The torrent work consists of the usual stepping of the floor of the stream-bed with masonry walls, stones, or faggots. As soon as partial stabilization is effected in this way, patch sowings are made on the hill-sides, using Maritime pine, Aleppo pine, Pubescent oak, and Sweet chestnut." (Guillebaud 1932, p. 174).

At the farewell dinner on September 17, 1932, "representatives of various nations expressed the pleasure to have gained considerable knowledge and good emotions during the successful tour, noting that the Congress ended in an atmosphere of amiability and forest friendship" (IUFRO 1932, p. 869). The delegates departed from Nice on September 18, 1932.

Russian/Soviet participation

There are grounds to believe that the decision to send or not to send a delegation from the USSR to this Congress could be made under the influence of critical remarks about the previous Congress, made by its delegates. For instance, Professor A.V. Tyurin found the Stockholm Congress of 1929 and its excursions highly praiseworthy, on the one hand; but on the other hand, he noted that "the abundance of papers and lack of time resulted into, as a rule, very brief presentations during the sections' meetings, approximately in the same volume as they were printed. (…) For the same reason, to save time, the papers were not discussed, but only taken to note. Therefore, those sessions were boring, and the Congress delegates attended them rather irregularly and reluctantly. Many participants concluded that it was not necessary to read the paper as it had been printed, and those who wanted to discuss them with the authors could do so during the excursions. As I have already said, the most valuable part of the Congress was the excursions, the opportunity to have personal talks about what we saw. During such talks, a variety of issues was raised, views of specific scientists were identified and key messages from some papers were discussed." (Тюрин 1929b, p. 54).

Such observations were made during other Congresses as well; therefore, the Union tried its best to keep improving its work and organization of its Congresses.

Interesting facts

The focus on study tours was about to turn from the advantage of the Congresses into their burden. Most delegates could participate only in a part of the Congress or excursion program. Long, 6-8 day trips were as tiring as 6-8 day continuous meetings. In addition, the delegates' accompanying persons, especially women, also needed some attention. But, except for the opening and closing days of the Congress, a Congress should be neither mentally nor physically tiring, it should not require greater efforts, and excursions during the Congress should provide an opportunity to alternate sessions with outdoor events. To this end, the meeting of the Permanent Committee decided to shorten the duration of Congresses to 12-14 days, and the schedule for the next Congress in Hungary was prepared with due regard to these considerations (IUFRO 1936a, pp. 8-9).

[108] About £ 25 to £ 110 per ha.

Chapter 13
Congress IX - August 25-September 8, 1936, Budapest, Hungary

The bulk of the information for this Chapter was drawn from the Report of the IX IUFRO Congress, published under the editorship of Gyula Roth (IUFRO 1936a, b), and an article of a Congress participant (Guillebaud 1936).

Overview

At last, after almost a quarter of a century, the IUFRO Congress came to Hungary. Professor Gyula Roth, Head of the Hungarian Forest Research Service, chaired the 9th Congress. Unlike the previous Congresses, the meetings were held in more than one place and in several cities, including Sopron, Pécs, Szeged, Budapest, Debrecen and Lillafüred. "This had the advantage of breaking the otherwise somewhat severe strain of a whole week of paper-reading and conferring, but had other drawbacks, which became apparent as the Conference proceeded" (Guillebaud 1936, p. 156).

The Congress was attended by 135 representatives (116 men and 19 women) from 23 countries[109], with about 70 delegates from abroad[110]. The most representative delegation was that of Hungary (43 people). Large delegations were from Finland (16 persons), Poland (14), Czechoslovakia (10), Germany (9) and the British Empire (7 delegates, including 4 from the UK and 1 from each of India, Burma and Australia).

The agenda included 7 sessions, 84 reports (including 77 research papers) and 10 excursions (IUFRO 1936a). It should be noted that, as expected, the II World Forestry Congress was held in Budapest, just after the IUFRO Congress – on September 10-14, 1936.

On August 25, 1936, the opening ceremony of the Congress took place in the main building of the University of Sopron. In front of the building, high mast raised the flags of the participating countries (in alphabetical order): Australia, Austria, Belgium, British India (Burma and India), C.S.R. (Czechoslovak Republic), Denmark, Finland, France, Germany, Great Britain, Italy, Japan, Latvia, Netherlands, Norway, Poland, Romania, Switzerland, Sweden, the USA, Yugoslavia, and in the centre – the emblem of the host country – Hungary.

President of the Union G.Roth opened the Congress in the French, English and German languages. In the beginning, he said "Gentlemen! Four years ago, at our Congress in Nancy, I bade goodbye to you, using the following Hungarian words 'A viszontlätäsra az en hazämban', which means 'See you in my country!' I am happy that my words have come true, and I am honoured to welcome you here at the western gate of my country".

He noted, in particular, that Hungary could not demonstrate such exemplary forestry sites as Sweden or France had done. Although, Hungary would like to show not only the work of its research institutions, but also its practical forestry, wood science, forests on the quicksand and on leached soils, and as far as it was possible in a short time - Hungarian people, land, life, customs, and Hungarian cuisine (IUFRO 1936a, p. 22-23).

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[109] In fact, 22 countries participated, if count British India as one country, because as of 1936, it consisted of Burma and India.

[110] Former President Ph. Guinier said in his greeting remarks that 91 people from abroad, as well as 17 women, participated in the Congress, they represented 21 countries (IUFRO 1936a, p.25).

The opening session was attended by many honoured guests, including representatives of the Ministry and Forestry Committee of Hungary, as well as Count Werner von der Schulenburg[111] and his wife. The audience was welcomed by Prefect of Sopron Dr. Lajos von Ostffy (in French), Rector of the University Professor Pâl Podmaniczky and Dean of the Faculty Professor Kâroly Walek.

The Congress used three languages (German, French and English). The indoor work of the Congress consisted in presentations of research papers on a wide range of forest issues, and discussion of the sub-committees' reports, identified at previous conferences.

The main Committees considered such issues as forest bibliography, site description, methods of sample plot establishment, nomenclature of humus, podzolized soils, seeds, trees, and tapping. In addition to the existing sections, the Congress established one more section to address forest management planning (IUFRO 1936a, Guillebaud 1936, Schmutzenhofer 1996a).

Scientific program

Professor Gyula Roth made a keynote report on the scientific and research work in Hungary. He demonstrated the development of the network of forest experimental plots across the country.

The program of the Congress was a mixture of excursions and meetings. The first session outside Budapest took place on August 29, 1936, in the city of Pécs. Chaired by Guinier (France) and Eide (Norway), the morning session included reports on forecasting in forestry (Fabricius); on Dutch elm disease in the Slovenian forests in Yugoslavia (Georgevic); on afforestation of moving sands (Magyar); on the secondary pests (Nunberg); on linear intermingled felling (Roth); and on the regional methods of thinning (Weingartl).

On the sixth day of the Congress, August 30, 1936, in the city of Szeged, Dr. Lciszlo Erdelyi, Rector of the local Franz Joseph University welcomed the delegates of the Congress. He said that Hungarian Queen Maria Theresa was one of the first in Europe to adopt the teachings of Rousseau, Quesnay, and the physiocrats, who, unlike adherers of mercantilism and industrialism of Colbert, regarded nature as a supreme value. Therefore, in Selmecbánya, in 1760, the Mining Academy was opened where the Forest School was established later and grew up into the Forestry Academy. The war almost destroyed Hungarian forests; so, the country had to make immense efforts for their restoration.

Later on, under the chairmanship of Fabricius (Germany) and Lönnroth (Finland), the participants listened to a series of reports: on profitability of the locust (*Robinia pseudoacacia*) (Fekete); on the soil conditions in the plains (Ijjasz); on the geography of the area between the Danube and the Tisza Rivers (Kogutovicz); on afforestation issues (Magyar); on selective felling of deciduous forests (Schäffer); on growth and yield of natural regeneration of spruce (Tertti); on the importance of improving the quality of thinning (Wiedemann); and on economic research in forest management (Weingartl).

During the week, the participants travelled across the country. On September 1-3, 1936, they returned to Budapest, and the Congress continued its work in the University.

In general, the Congress was divided into six sections and sub-sections as follows (IUFRO 1936a, p.102):

[111] Earl Werner von der Schulenburg (1875-1944), a German diplomat, Ambassador of Germany to the Soviet Union (1934-1941), and earlier, Vice-Consul in Warsaw (1906-1911) and in Tiflis (1911- 1914), which had been parts of the Russian Empire in that time (Schulenburg 2007).

I. Waldbau. — Sylviculture. — Sylviculture.
I. A) Pflanzenkunde. — Botanique. — Botany.
a) Lebenslehre. — Biologie. — Biology.
b) Samenkunde. — Semences. — Seeds.
c) Holzarten. — Essences. — Species.
I. B) Bestandespflege. — Entretien. — Tending.
a) Aufforstung. — Boisement. — Afforestation.
b) Durchforstung. — Éclaircie. — Thinning.
c) Verjüngung. — Regeneration. — Regeneration.
II. Forstbenutzung. — Exploitation. — Forestutilization.
III. Standortslehre. — Station. — Locality.
III. A) Bodenkunde. — Pédologie. — Pedology.
III. B) Klima. — Climate. — Climat.
IV. Forstschutz. — Protection. — Protection.
IV. A) Krankheiten. — Pathologie. — Pathology.
IV. B) Schädlinge. — Nuisibles. — Destructives.
V. Forsteinrichtung. — Aménagement. — Organization.
VI. Verschiedenes. — Diverses. — Various.

On the eighth day of the Congress, September 1, 1936, the meeting on silviculture, chaired by Trevor (India) and Vincent (Czechoslovakia), discussed the following reports, related to: tree roots (Guillebaud; Polansky); forest types (Kujala); arboretum studies (Laitakari); growth and development of pine (Nemec) and spruce (Vincent).

At the meeting on soil science, chaired by Zon (USA) and Kalnins (Latvia), reports were related to: podzolic soils (Aaltonen); degradation of forest soils (Nemec); chemical composition of litter (Nemec); statistical research in soil science (Nemec and Maran); hydrological studies (Laszlöffy); standardization in the description of locality (Pavari; Oudin).

On the ninth day, September 2, 1936, the Congress continued its work under the chairmanship of Dr. Dracea (Romania) and Bornebusch (Denmark). Presentations were made on the international provenance study (Delevoy), forest seed research (Wloczewszki), evaluation of seed germination (Eidmann), seed control (Vincent), and physiology of white pine (Schmidt). Drs. Hausbrandt (Poland) and Ugrenovic (Yugoslavia) chaired the session on soil science. The following reports were presented: forest lands (Bokor); needs for pollination in nurseries (Nemec); chemical and physical properties of some soil profiles (Nemec and Maran); spruce stands in the Czechoslovak Carpathians (Vincent); and impact of the Mediterranean forests on the climate (Pavari).

On the tenth day, September 3, 1936, during the meetings on forest utilization under the chairmanship of Jager-Gerlings (Holland) and Tschermak (Austria), the following reports were made: a comparative study of two types of the sessile oak (Dramba); use of resin as a wood protector (Kalnins); drying and storage of wood products (Levon); resin drive and tapping (Roth; Ugrenovich); tapping of the black pine (Udine); and properties of wood of the Polish larch (*Larix polonica*) (Zielinski).

At the meetings on forest management under the chairmanship of Pawari (Italy) and Badoux (Switzerland), the following reports were delivered: increase in the number of pine needles (Burger); volume and increment of the beech in Denmark (Bornebusch); *Guidelines for the research of income*; Report of the commission seconded for this matter (Fabricius); comments to the *Guidelines* (Leporsky) and a proposed amendment to the *Guidelines* (Schmidt); possibilities to improve the growth investigations (Grochowski); the model-derived process (Leporsky); preliminary description of the elements for yield tables (Plonski).

In the afternoon, delegates could go to the excursion to the arboretum of Archduke Joseph in Gödöllö, the only experiment site in Hungary, established before the war.

On Friday, September 4, 1936, on the way to Debrecen, the delegates visited the experimental plots for reforestation as well as a hole of deep drilling (Hajdüszoboszlö) where healing thermal waters of 73°C were coming up out of the ground from a depth of 1091. The next day, on September 5, 1936, after the morning meeting in the local University, the participants admired picturesque pastures, meadows, and old bridge in the neighbourhood and visited a museum.

On September 8, 1936, the last, 15th day of the Congress, the meeting began at 9:00 a.m. at the Palota Hotel in Lillafüred. The first session was a meeting of the Working Committee, and it was followed by a meeting of the International Committee at 10:00 a.m. The final plenary session began at 11:00 a.m. The Director of the Forest and Park Service of Finland, Dr. Aimo Cajander,[112] participated in this meeting and was elected Honorary President (Guillebaud 1936, p.159).

Chairperson Gyula Roth summed up the work of the Congress, and after lunch, the participants returned to Budapest.

According to a participant, one series of reports aroused special interest at the Congress. These reports were about thinning in relation to value increment, and they demonstrated an effort to focus attention upon the timber quality aspect of sample plot investigations. "The principal contributors to this subject were Prof. Wiedemann of Eberswalde, Dr. Bornebusch of Denmark and Prof. Ugrenovic of Yugoslavia. Another paper which may be mentioned is one by Dr. Eidmann of Eberswalde in which he described methods of replacing the ordinary germination tests by a chemical test, using salts of selenium or tellurium. Professor Schmidt, also of Eberswalde, read an interesting paper on the diagnosis of the racial characteristics of Scots pine by determining the phototropic reactions of the seedlings. He claimed that the method was both quick and reliable, as the analysis could be carried out on seedlings only seven days after germination" (Guillebaud 1936, p.156).

However, the most important work of the Congress was associated with the reports of the sub-committees. After the Congress of 1932 at Nancy, the sub-committees worked relatively actively, and in some cases, the objectives were almost achieved.

The sub-committee for developing a Standardized Scheme of Locality Description fulfilled its task: It published and presented a report, containing three schemes, by region: 1) temperate and cold, 2) the Mediterranean, and 3) tropics. This division was found to be useful, yet too complex in some aspects, but it was accepted by the Congress. Another sub-committee finalized the *Nomenclature of Humus Types*. Such a harmonized nomenclature had been adopted previously by the Congress at Nancy, then at the International Congress of Soil Science, which was held at Oxford in 1935. This sub-committee was not abolished, but was merged with another committee dealing with the problem of degraded (podzolized) soils. Perhaps this decision was made because the nomenclature of humus was developed mainly for forest soils, and because modifications might be needed in the case of humus classification for non-forest land (heath and swamps). Due to lack of visible progress in the work of the sub-committee on podzolized soils, its composition was changed: Professor Hesselman (Sweden) was appointed Chairperson and Dr. Nemec (Czechoslovakia) was appointed his Deputy.

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[112] Aimo Cajander was born on April 4, 1879, in Neishtadt, Grand Duchy of Finland, an autonomous part of the Russian Empire. He was a Professor of Forestry (1911-1934), Director General of the Finnish Forest and Park Service (1934-1943), served three terms as the Prime Minister of Finland (1922, 1924, and 1937–1939). He visited virgin forests of Siberia and the Southern Urals along the Siberian railway, the steppes of Buryatia, and the lower Lena River Valley (Ilvessalo 1949, p.4). "At the beginning of the 20th century, Cajander worked in the forests of Northern Russia, in Siberia, directly communicating with Russian forest dwellers, our people – these first forest typologists; Cajander could not be out of the influence of these typological ideas; they could be developed by him in the future" (Мелехов 1948, p.20).

The sub-committee on standardization of sample plots methods developed an agreed report, titled *Outlines for Permanent Sample Plot Investigations* which was published in German, French and English. In general, those recommendations were a summary of the practice of the German Forest Research Stations of that time, brought up to date to accord with the more recent development in sample plot methods. The document was circulated long before the Congress, but the proposed amendments were not discussed because most of them, as often happened in such cases, did not reach the sub-committee in time. It was decided that the sub-committee would continue its work until the next Congress; and prior to the Congress, it would consider the criticism and include agreed amendments in the document. During the discussion, several delegates raised the question about how this document could be considered binding upon relevant research institutions, which might collectively approve the scheme. In response, Chairman of the sub-committee, Professor Fabricius (Germany), Chairman of the sub-committee, noted that the *Outlines* should not restrict any institution to adopt it as it was, or the stations themselves "remained free to retain or amend their existing procedure as they saw fit" (Guillebaud 1936, p. 157).

The sub-committee on forest bibliography was unable to present a formal report. This was because its Chairman (Professor Troup) could not attend the Congress due to his illness, two other members (Professors Weber from Germany and Jedlinski from Poland) had died after the Congress at Nancy, and neither Professors Perren (France) nor Flury (Switzerland) were able to be present in Hungary. A meeting of those interested in the question was held at Debrecen, with Professor Burger of Switzerland in the chair, at which many of the outstanding problems were discussed. It was noted that significant progress had been made over the past four years. Thus, the indexing scheme, drawn by Professor Flury, was generally adopted and in operation, and the majority of the countries in Europe had issued indexed lists of their forestry literature which had appeared during the year 1934. At Debrecen, a number of delegates raised the question about the revision of the index, and it became apparent that some modifications were desirable – in particular the sections relating to policy and economics, and to entomology. During the discussion, Professor Burger mentioned the format in which the records should be issued, and urged that these should be printed in a form in which they could be bound. He pointed out that the smaller research stations would have great difficulty in dealing with the very large number of cards which the scheme might produce, and suggested a standard size of 21 cm. x 30 cm. for the records. Professor Abetz made three suggestions: (1) titles of journals should be given in full and not abbreviated; (2) the country in which the journal was published should be stated; (3) the title should specify, where necessary, the country or countries to which the article relates.

The still more difficult question of abstracting forestry literature was raised. It was decided that this and other questions would be further considered by the reconstituted sub-committee, consisting of Professor R.S.Troup (Great Britain), Chairman; Professor Ph. Flury (Switzerland), Honorary Member; Professors H. Burger (Switzerland), K. Abets (Germany), H.Perren (France) and E. Saari (Finland).

It should be specifically mentioned that under the leadership of Dr. Phillip Flury (Birmensdorf, Switzerland), the *Forest Bibliography: an International Decimal Classification on the basis of Melvil Dewey's system* was first published in German in 1933, and translated into English and French in 1936. As Dr. Ph. Flury noted, it was "English translation from German prepared and issued by the Imperial Forestry Institute, Oxford. Translation of technical terms was kindly verified by Dr. C.A. Schenck" (Flury Ph. 1936). Before this Congress, the Imperial Forestry Institute (Oxford) had begun the card indexing via the adoption of the "Flury system" under the leadership of Professor R.S. Troup (Oxford, U.K.), and initiated a specialized publication of the *Current Monthly Record of Forestry Literature* (from 1934). The first issue of the *Forestry Abstracts*

was published in 1939, replacing the *Current Monthly Record…*, and it is still one of the major sources and networking instruments for forest science (Mills 2006).

The sub-committee on *resin tapping* was instructed to continue its work and to extend its activities to the collection of statistics on the industry. The Congress established a new sub-committee to address *problems of tree seeds.* It was chaired by Professor Schmidt (Germany). Its purpose was, among other things, to collect information related to the geographical distribution of the most important races of forest trees. The sub-committee on *investigation of the technical properties of timber* was appointed and chaired by Professor Fabricius to make proposals on the subject. The sub-committee on *forest entomology* was reorganized into an international committee, chaired by Professor Trägårdh, Sweden. Due to the late reception of the reports, their timely publication was difficult. In addition, two sections had their meetings at the same time, and it adversely affected the quality and comprehensiveness of the report about the presented papers (Guillebaud 1936). Therefore, the summary reports were published later (IUFRO 1936b).

Organizational matters

IUFRO General Secretary Sven Petrini noted in his report that after the Congress of 1932, the number of IUFRO member-organizations had increased from 85 permanent members in 31 countries to 92 permanent and 6 individual members in 35 countries. Furthermore, the cash flow had increased from less than SEK 4,500 to more than SEK 19,000 (CHF 15,000). The work was conducted in all the areas, designated at the previous Congress. The Secretariat, where possible, had alerted the members of the Union on its activities by means of sending annual reports, circulars and letters about all the important results to the members. In addition, the reports of the sub-committees had been disseminated (IUFRO 1936a).

Two decisions were taken: (1) the Permanent Committee would be composed of eight or nine members and would meet annually in the period between the Congresses. It would play an important role in the work of the International Union, constantly monitoring the work of its sub-committees and the implementation of the previous Congress resolutions; and (2) the next Congress would be held in Finland within the next 4-5 years.

Professor Erik Lönnroth from Finland was elected President of the Union (1937-1948), and he was destined for a hard life as the guardian and protector of the Union not only during the war, but also in the post-war period.

Resolutions

"Various resolutions were put to the Congress at the final session at Lillafüred. These included among others: (1) a proposal for the investigation of the influence of the forest upon the local climate; (2) the need for the pooling of work in different countries on elm disease; (3) a recommendation that all important articles in forestry periodicals should be provided with a short author's abstract in either French, German, or English and that claims of copyright should be waived in such summaries – for instance, they could be reproduced in abstract periodicals or elsewhere, without special permission being required. These resolutions were adopted in the main and transmitted to the Standing Committee of the International Union for appropriate action" (Guillebaud 1936, pp. 158-9).

Excursions

The program of excursions consisted of two parts: one was for the delegates of the Congress and the other one was offered to family members and guests. The route went through the key research and experimentation sites in Hungary, referred to by D. Roth in his keynote address to the Congress, with some of them also shown in the album, made by L. Fekete and Y. Blotny, and printed

in 1914 in Germany. In the course of the journey, which covered about 3,000 km by road, the delegates gained a fairly good picture of the cultivation of the land, distribution of forest and forest management in Hungary. During the Congress, its delegates visited the chief centres of forest research in Hungary. There were three main subjects of investigation, namely: (a) methods of natural regeneration of oak, beech, and other hardwoods; (b) afforestation of drift sands in the tracts between the Danube and the Tisza rivers, and (c) afforestation of Szik (alkali) soils on the East side of the Plain of Hungary. Interesting features of the afforestation work were (1) the study of the natural vegetation and its classification into types in relation to treatment, and (2) the investigation of root development of the trees used for afforestation.

Before World War One, Hungary had had fairly large forest cover, but in the treaty of Trianon, it lost practically all its mountains, which formed the rim to the Great Plain of Hungary, and with these over 80% of its forests. In 1936, Hungary consisted predominantly of a vast plain, given up for the most part to the cultivation of wheat, maize, and fruit, but interspersed with plantations of *Robinia pseudacacia*. There were a few minor hill ranges (the highest point in the country was not more than 1,000 m above sea level), covered partly with vineyards and partly with broad-leaved forest: oak, beech, and hornbeam. The oak forests consisted, for the most part, of coppice converted into high forest. The road network was not well-developed, and the result was that the crops had suffered from lack of thinning.

In the last part of the tour, the delegates visited fine beech forests around Lillafüred in the north-east of Hungary. Unlike some other countries, the marketing of forest produce was relatively a simple matter in Hungary: the timber was mostly of small size and there was almost unlimited demand for firewood. The proportion of the total area of the country occupied by forest was about 12%, and even this appeared high in the vast and almost treeless Great Plain. Over 95% of the forests were composed of hardwoods (Guillebaud 1936).

On August 25 and 26, 1936, the delegates were in the vicinity of Sopron. On August 25, 1936, after the morning session in the University and lunch, they had a tour around the University, visited its Mining and Metallurgy Faculty and the Botanical Garden.

On Wednesday, August 26, 1936, they visited three experimentation sites where City Forester Nandor Zügn together with D. Roth showed them reforestation areas in mixed stands, larch/chestnut stands, oak natural regeneration and planting of conifer stands.

The Central Research Station of the Forest Service was located at Sopron, in the west of Hungary, and was headed by Professor Roth. In a number of the centres, investigations were in progress. For instance, investigations took place in an area for natural regeneration studies near Veszprem to the north of Pécs; a block of 400 ha of alkali soil not far from Debrecen in the east of Hungary,;and a similar area of blown sand in the inter-riverine belt between the Danube and the Tisza. These two large blocks represented the principal types of difficult soil and were the subject of numerous experiments in afforestation. In addition, there were about 40 sample plots for the study of thinning methods.

The participants of the tour visited a meteorological station, and saw key motor vehicle brands. Double stations were set up under canopy in the forest and the other on open grounds in the immediate vicinity. The instruments of the forest-based stations included usual screen thermometers, soil minimum thermometer, evaporimeter, soil thermometers at depths of 5, 10, 15, 30, 60, and 120 cm, rain-gauge, and a well for the measurement of the level and temperature of the ground water. In the open stations, there were, in addition, a sunshine recorder, maximum insolation thermometer, wind vane, and three different types of rain-gauge (Guillebaud 1936). Then the group went to Lake Balaton. The excursions were focused on the following lines of research: (1) systems of natural regeneration of broadleaved trees; (2) afforestation of shifting sands, (3) afforestation of the alkali soils, and (4) beech forests in the northern part of the country.

On Thursday, August 27, 1936, the delegates visited Veszprem. There, they examined the forests belonging to the Archbishop of Veszprém, and then, areas for reforestation and experimental thinning (rejuvenation of forest stands). They were acquainted with the system of natural regeneration, developed by Professor Roth, which was closely related to the *strip cutting of* Wagner, but differed from it in two features. Firstly, instead of felling on only one side of the strip, Roth proposes to fell on both sides and thus to speed up the rate of progress. Secondly, while Wagner set forth a more or less hard and fast rule that felling should proceed from north to south, with the felling front accordingly running from east to west, Roth's system was basing the felling direction primarily upon the topography, and felling proceeds towards the easiest line of extraction. The group inspected several experimental areas in each of which three systems of regeneration were practiced in adjacent blocks, with the size of the blocks ranging from 40 to 60 ha. The systems were (a) Gayer's group system, (b) Wagner's strip-and-group method, and (c) Roth's system.

In the morning of August 28, 1936, the excursion participants drove to Pécs, and on their way, in the vicinity of the city, they visited a similar series of plots in the State Forest of Pécs (August 29, 1936). The delegates inspected areas which had suffered from the elm disease; afforestation areas on shifting sand; forests, infested with secondary stem pests; and areas where various thinning practices were demonstrated. After lunch, they left for Szeged where they arrived at 10:00 p.m.

On the sixth day, in the morning of August 30, 1936, the Congress had a session in Szeged to hear reports and papers. Then, Karol Kogutovicz, Professor from the University, led them to the *Tanya* Farm where they could taste local fruit.

On the seventh day, August 31, 1936, the delegates visited the experimental plantations on drift sands near Kecskemét. That area was characterized by low precipitation rates of only about 500 mm per annum, and hot and dry summers. The sand, which varied considerably in composition, often covered an earlier soil of a black-earth-like character. In one profile, the layer of drift sand was 60 cm in depth. This rested upon about 60 cm of black humose sand which passed fairly abruptly into a whitish sandy layer some 90 cm in thickness, containing about 20% of lime; below this was a great depth of yellow sand.

An area of some 500 ha was afforested by the district forest staff in the period of 1920-1923, principally with *Robinia pseudacacia* which covered 70% of the area; other species included poplars, birch, alder, and small quantities of Austrian pine, elm, oak, and ash. The *Robinia* throve only on the better sites, and where it failed, it was replaced largely by Austrian pine. In 1931, the area was handed over to the Research Branch, which began numerous experiments with a large variety of species. It also stopped the clear felling with the originally adopted rotation of 20 years, (later raised to 30 years) and regeneration from the stool shoots of the broad-leaved species; and, instead, adopted a policy of a selection type of felling in the hope for natural regeneration. An interesting feature of this area consisted in the botanical investigations, which had been in progress for upwards of 50 years, and enabled to establish a close relationship between soil quality and plant association (Guillebaud 1936). After the evening meal of chicken skewers, the delegates departed for Budapest.

On September 1-3, 1936, the Congress continued its work in Budapest, in the University (the morning sessions). In the afternoon, the delegates visited various sites, such as a local museum, and the forest of the Budapest Water Supply Station. They were also at the reception hosted by the Minister of Agriculture; took boat trips along the Danube River; and visited the Arboretum of Archduke Joseph in Gödöllö. During those two days (September 4-5, 1936), on their way to Debrecen, the delegates visited experimentation sites of reforestation and admired the local scenery.

Alkali soils covered vast areas in the east of the Great Plain of Hungary. These alkali soils were closely akin to the so-called *solonetz* types of southern Russia. The parent rock was loess, a fine textured soil almost free from stones and often containing a high proportion of silt. The soils

had developed as a result of the combination of low rainfall, high evaporation, and underground water rich in bases.

The plant associations on the alkali soils had been carefully studied and divided into four types: Type I, *Poa-pratensis-Cynodon dactylon;* Type II, *Festuca pseudovina, Achillea-Inula* sub-association; Type III, *Fistuca pseudovina, Artimisia-Staticc* sub-association; type IV, *Camphorosoma Ovata*. Of these, type I represented the best and type IV the poorest conditions. In the afforestation of these soils, special attention was paid to the root systems of trees and shrubs.

Considering the low rainfall, especially in summer, it appeared certain that only those plants would thrive which were able to push their roots through the very compact B (accumulation) horizon and reach the water table below. Investigations showed that on the lighter, better, types of alkali soils the roots of most of the species, such as *Robinia*, elm, poplar and pine, were able to get down to the water table, but that on the more loamy soils relatively few species were able to push through the hard B horizon. The studies covered various tree and shrub species, including: *Tamarix* spp., *Eleagnus angustifolia, Quercus robur, Amorpha fruticosa, Pyrus pyraster, Ulmus campestris, Sophora japonica, Robinia pseudacacia, Populus* spp., *Pinus* spp., and *Acer* spp. (Guillebaud 1936).

The 13th day of the Congress, September 6, 1936, was spent in Debrecen. After the morning session and lunch, the participants went to Tolcsva (through Nyiregyhaza and Tokaj) for wine tasting at the invitation of Baron Kelemen Waldbott, Chairman of the Hungarian National Forest Association and Chairman of the 2nd World Forestry Congress. In response to the welcome address from Baron Waldbott, Sir Roy Robinson from England spoke on behalf of the guests. At night, the participants arrived at Lillafüred[113] near Miskolc, the fourth largest city in Hungary (IUFRO 1936a).

On the 14th day of the Congress, September 7, 1936, the participants visited the beech forests of the northern mountain ridges. Lillafüred was an attractive small resort, located on wooded hills near Miskolc. From there, they travelled into the hills behind and also into the Matra Mountains, belonging to the lower spurs of the Carpathians where they climbed to the Kekes, the highest mountain in Hungary (1,014 m above sea level).

In the mountains, the participants saw several excellent young stands of oak, larch, and other species. Larch was notably fast growing and healthy with narrow crown and ascending branches. European larch of the lowland, Sudeten type, was probably not indigenous in these hills, but in this species, the Hungarians would appear to have a useful addition to their forest trees. The beech forests in the Bukk-Gebiete and in the Matra hills were quite extensive and the growth as well as the type of forest showed that the conditions here could not be far from the optimum for beech (IUFRO 1936a; Guillebaud 1936).

The final session of the Congress was held in Lillafüred on September 8, 1936, and on September 9, 1936, the Congress returned to Budapest where some of the delegates remained to take part in the second International Forestry Congress which began on September 10, 1936.

Soviet/Russian participation

No representatives from the USSR participated in the Congress.

Nevertheless, it should be noted that the Congress was attended by at least three representatives from the former Russian Empire. In addition to abovementioned Professor Aimo Cajander (1879-1943) from Finland, they were Raphael Zon (1874-1956) from the USA and Dr. Arvids Kalniņš (1894-1981) from Latvia.

Raphael Zon was born on December 1, 1874, in Simbirsk, Russian Empire. He studied in the Simbirsk classical school, from which Vlsdimir I. Ulyanov/Lenin (1870-1924) graduated. His fondness of natural and medical sciences led him to the Medical Faculty of the Kazan Imperial

[113] The forest which is part of the largest Hungarian national park (Bükki National Park), established in 1976.

University and he graduated from there with a bachelor's degree in comparative embryology. He was engaged in politics, established a trade union and was arrested for short periods for such activities. He emigrated from Russia to Belgium where he studied during several months in a college in Brussels and in the University of Liège. He lived a few months in London, and moved to the USA in 1898 (Rudolf 1957), where he was admitted to the newly opened New-York State College of Forestry under the Cornell University (Ithaca, New-York) where he learnt the basics of forestry from Bernhard Fernow, Filibert Roth, John Gifford and other well-known foresters. He got a professional degree of Forest Engineer (F.E.) in the college's first graduating class in 1901, moved to Washington, D.C., and started to work in the U.S. Forest Service. He was on friendly terms with Gifford Pinchot (1865-1946), first Chief of the United States Forest Service. He held various offices in the U.S. Forest Service and worked there until his retirement in 1944 (Schmaltz 1980).

In 1904, Raphael Zon joined the Society of American Foresters, and in 1905, he became a member of the Editorial Board for the *Forestry Quarterly* Journal and *Proceedings of the Society of American Foresters*. In 1907, he was appointed Chief, Office of Silvics, later, Forest Investigations in the U.S. Forest Service.

In 1908, he visited Forest Experiment Stations in Germany, Austria and France[114], and, upon his return from Europe, he proposed to establish a network of decentralized forest experiment stations in the USA. In his memo, titled: *Plan for Creating Forest Experiment Stations*, submitted to G. Pinchot, he justified not only the need to establish the forest station in Fort Valley, Arizona, but also the need to plant experimental forests to assess their growth from the very beginning (Young 2008). Other forest experiment stations were put in place in Colorado, Idaho, Washington, California and Utah. In 1910, the Forest Products Laboratory was established in Madison, Wisconsin.

In 1914, he took part in the foundation of the Ecological Society of America; and in 1918, President Woodrow Wilson appointed him Member of the National Research Council, NRC. In 1923, he was appointed Director of the newly established Lake States Forest Experiment Station, St. Paul, Minnesota and Editor-in-Chief of the Journal of Forestry (he held that position until 1928). R. Zon participated in the first International Congress of Soil Scientists in 1927 in the USA in his capacity of the American Vice-President of the Forest Soil Sub-Committee. In 1929, R. Zon managed to focus the program of forest research on establishing forest shelterbelts on flatland, in prairies and on disturbed soils. It became possible, to a great extent, owing to his profound knowledge of forest cultivation in Russian steppe areas to protect agricultural land and grazing grounds against droughts and dry hot winds (Schmaltz 1980).

The 1939-40 New York World's Fair named him one of “Foreign-born citizens judged to have made the most notable contributions to American democracy in the past 100 years” (Rudolf 1957). In 1952, he was the second in the list of recipients of the Gifford Pinchot Medal, “awarded in odd-numbered years only to recognize outstanding contributions by a forestry professional in the administration, practice, and professional development of North American Forestry” (Gifford Pinchot Medal 2013, p. 1).

Professor Arvid Kalniņš (1894-1981) was born in the Russian Empire (Bebri Parish, Riga District, later: Ogre District, Latvian Soviet Socialist Republic, and now: Koknese Municipality in Latvia). In 1916, he graduated from the Riga Polytechnic Institute (the Faculty of Chemistry) with the degree of Forest Engineer-Technologist (Chemist). He worked in Volhynia, in Zhytomyr. In 1920, he returned to Riga and was actively involved in the establishment of the Forest Department at the Faculty of Agriculture in the University of Latvia where he headed the Chair of Forest Technology, later.

His research work was specifically focused on relationships between “technical properties

[114] R. Zon could fluently speak and write in Russian, English, German, French and Spanish.

and chemistry of wood and tree site conditions as well as possibilities for man-made influence on soft resin generation and efflux in growing pine trees. The results of those studies were reported at the World Congress of Forest Experimentation Institutions and were highly praised; further research in this field provided a basis for his successfully defended thesis (Сергеева 1964, p. 33).

Professor A. Kalniņš participated in the IUFRO Congresses in 1929 and 1936. At the Congress of 1936, he presented his paper on the use of resin for wood conservation (*Harzung als Holzkonservierungsmittel*).

In the post-war time, when the Academy of Sciences of the Latvian SSR was established (in 1946), Professor A. Kalniņš was elected its Academician. Per instruction of the Academy, he participated in the efforts to organize the Institute of Forestry Problems (later, renamed into the Institute of Wood Chemistry). Professor A. Kalniņš headed the Chair of Wood Chemical Technology at the Faculty of Chemistry in the Latvian University.

Interesting facts

Strange as it may seem, Hungary had been practically fully prepared the Congress to host it in 1914, but these plans were disrupted by the outbreak of World War One; it finally had the opportunity to host the Congress, in 1936, just before the outbreak of World War Two.

[Participants of the Congress during the excursion, Lillafüred, Hungary, 1936.
Source: IUFRO 1936a.]

Chapter 14
Congress Cancelled – 1940, Helsinki, Finland

The next Congress was to be hosted by Finland in Helsinki, but their destiny was as dramatic as that of Budapest and Hungary. The decisions to hold the 3rd World Forestry Congress and the 10th IUFRO Congress were adopted in Hungary in 1936. Those planned events were complemented with the 12th Summer Olympic Games.

The 12th Summer Olympic Games were to be held in September-October 1940 in Tokyo. It should be noted that in 1936, when the International Olympic Committee (IOC) decided to make Tokyo the venue for the Olympic Games at its meeting in Berlin, its members knew about the militarization of the country, but they asked the Government of Japan to confirm its proposal (Roche 2000, p. 121). In 1937, Dr. Matsuzo Nagai, Secretary of the Organizing Committee for the Olympic Games in Tokyo, wrote that the preparation was going smoothly and Werner Klingeberg, Representative from the IOC, reported about "positive progress" (Paton and Barney 2002, p. 95). In the same year (1937), the second Japanese-Chinese War broke out, and in March, 1938, the Japanese Government refused to host the Games. The IOC suggested holding the Games in Helsinki on July 20 - August 4, 1940.

Therefore, three major international events were scheduled for the summer of 1940 to be held in Helsinki: the 10th IUFRO Congress in late June, the 3rd World Forestry Congress in July-August, and the 12th Summer Olympic Games right after it.

According to the decisions, adopted by the Congress in Budapest, the Congresses were prepared concurrently with the discussion about the establishment of the International Institute of Forestry or Silviculture (IIF), similar to the International Institute of Agriculture in Rome (IIA). The IIF was intended to be responsible for the preparation of forest congresses and administration of routine matters in international forestry, in cooperation with the IIA.

In 1937-1938, numerous consultations were held to discuss both the structure and location of such an institute. Proposed cities to headquarter the institute included Rome, Vienna, Geneva and Berlin. Eventually, Berlin was chosen by the Committee. It should be noted that after the Budapest Congress, the meetings of the Committee were not attended by representatives from England, France and the USA for a number of reasons (Saari 1939).

The Government of Finland approved the composition of the preparatory group for the IUFRO Congress. The preparation work was steered by Professor Erik Lönnroth, Dean of the Faculty of Agriculture and Forestry in the Helsinki University, who was also involved in organizing the IIF, and visited the IIA in Rome for those purposes.

World War Two prevented the Union from bringing its members together as scheduled, and also impaired international cooperation. The Summer Olympic Games took place in Helsinki in 1952, and in Tokyo in 1964[115]. The World Forestry Congress was held in Helsinki in 1949. As for the IUFRO Congress, Finland hosted it only in 1995, in Tampere, located at a distance of 180 km to the north-west from Helsinki.

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[115] Now, scheduled for the year 2020 in Tokyo.

The functioning of the Union was suspended for a long time due to World War One and the dissolution of three of Europe's Empires (the German, Austro-Hungarian and Russian Empires, whose foresters had taken an active part in the work of the Union), the emergence of new states, the Russian and German revolutions in Europe, and the need to restore the disturbed world order and most national economics, as well as many other factors. Many state borders were redrawn. Forest experiment stations, located in one country, suddenly found themselves in other countries. For instance, in 1919, the Forest Experiment Station in Schemnitz or Selmeshbanë ceased to be Hungarian because the city became part of the new state – Czechoslovakia (Banská Štiavnica, Slovakia), and the Forest School moved to Hungarian Sopron[116].

Naturally, this was the first time that such an ordeal and dramatic disruption had happened in the life of the Union. In addition, Jenő (Eugen) Vadaš -Vlkolínsky, the last pre-war Chairman of the Union (1857-1922), died after a long illness. The steering bodies practically ceased to coordinate its work; all were in confusion.

After World War One, the aspiration for forest experimentation revived.

Russia's concern about the revival of forest experimentation played its role, especially, upon adoption of the Forest Code of the Russian Soviet Federative Socialist Republic (1923) which legislatively defined the notion of *forest allotments for training and experimentation* (Article 38), made available (Article 39) to "respective institutions and enterprises on the basis of special regulations, drafted by the People's Commissariat for Agriculture and approved by Council of People's Commissars or the Council of Labour and Defense, depending on the jurisdiction" (Лесной кодекс 1923, p. 113-114).

The Forest Code contained a separate article to define forests, designated for training and experimentation and managed by training institutions/schools (Article 45), with the revenue from the use of such forests to be (Article 46) "channelled as earmarked proceeds to the budgets for respective training institutions/schools and to be spent on the development of training and experimentation in these schools and forestry needs of their forest allotments for training and experimentation, based on cost estimates, following established procedures" (*ibid.*, p. 119-120). It was emphasized that forest areas were not subject to withdrawal to be included in the land resources for other uses if they "may be suitable to meet health, training, research and experimentation and other similar objectives" (*ibid.*, p. 20).

In the same period, in 1926 alone Professor M.M. Orlov published four articles about forest experimentation (Орлов 1926a-d), and, later, he highlighted it in a chapter of his fundamental book about forest management (Орлов 1930b). It should be noted that Professor M.M. Orlov headed (1907-1917) the Special-Purpose Standing Committee for Forest Experimentation; and in 1922, he was appointed Director of the Department of Training and Experimentation Forest Management Units under the Leningrad Forest Institute. "Those long-term systematic and purposeful efforts of M.M. Orlov, no doubt, benefitted the development of forest experimentation throughout the USSR in that time" (Байтин 1969, p. 15-16).

It should be also said that government paid much attention to forest research and experimentation in that time, and it made it possible to put together a representative delegation of the USSR to the IUFRO Congress in 1929. It may be only guessed what the reason for the non-participation of Russian/Soviet foresters in the two subsequent Congresses was, because no direct evidence has been found to explain it so far.

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[116] Faculty of Forestry. University of West Hungary. http://www.emk.nyme.hu/ Accessed on November 13, 2016.

At the international level, the overall cooperation significantly benefitted from the decisions, adopted at the First World Forestry Congress in 1926, and the desire of many countries to restore the lost contacts. The 1929 Congress of the Union (in Sweden) revived its activities, confirmed the continuity of and commitment to the goals of the International Union of Forest Experiment Stations, and gave the Union its new name (the International Union of Forest Research Organizations), new Statutes and structure as well as a new mighty impetus towards its development.

During World War Two, IUFRO-based relations were not fully destroyed. This was thanks to the efforts of Professor Sven Petrini, Secretary General of the Union, and his country[117]: they did their best to ensure that the post-war Congress would be held in Scandinavia. Nevertheless, it became evident that the war had created a number of new major challenges for global forestry, and, hence, for forest research in any country (IUFRO 1948).

Professor Erik Lönnroth was the IUFRO President during that difficult decade (1937-1948), and it fell to him to undertake the most complicated mission of preparing the two Congresses, restoring the disrupted relations after the war to recuperate the Union, and addressing complicated issues of communication with other international organizations.

[117] Sweden remained a neutral nation during the war.

Part Four
Recovery (1945-1961)

Chapter 15
Congress X - September 5-11, 1948, Zurich, Switzerland

Information for this Chapter was drawn from the Report of the 10th IUFRO Congress in Zurich, published there in 1949 (IUFRO 1948) and an article about the Congress (Scheuble 1948)[118].

Overview

Zurich hosted a Congress of the Union for the second time. It was held under the patronage of Dr. Philippe Etter (Federal Advisor), Professor Arthur Rohn (Chairman, Supervisory Board, Swiss Federal Institute of Technology/ETH in Zurich), and Dr. Emilie Hess (Forest Inspector-General), as well as the Cantonal Government and the City Council of Zurich.

Compared with the pre-war period, IUFRO membership was reduced by half (44 member organizations) which, in any case, did not reflect the true interest in cooperation within the Union. It happened just because some former members were unable to pay annual fees and other reason was that the contacts were not restored yet.

The Congress was attended by 83 delegates (89, including accompany persons) from 16 countries, FAO and UNESCO. Half of the participants (42 delegates) represented Switzerland, 6 persons were from Finland, 5 from Great Britain, 4 from each of Italy, Poland and the Anglo-American zone of the occupation in Germany (the future Federal Republic of Germany), 3 from each of Austria and Sweden, 2 from the Netherlands, and 1 from each of the 7 other countries (Belgium, Czechoslovakia, Denmark, France, Greece, Norway, and Spain). The FAO was represented by R.D. Cameron, Head of the European Forestry Bureau of the FAO, and R.G. Fontaine (both from Geneva), and the UNESCO represented by Dr. S.W. Das-Gupta, Counsellor, Agricultural Sciences, Natural Sciences Division, Paris.

The agenda included six meetings, four plenary sessions and six routes of thematic excursions. The Congress was productive in its decisions, but was very modest (IUFRO 1948).

The working committees of the Union met during the Congress: the International Committee and the following seven technical committees on (i) cooperation with the FAO; (ii) forest bibliography; (iii) seed, racial and poplar questions; (iv) humus, podzolized soils and erosion; (v) wood research, including resin extraction; (vi) research methods, and (vii) forest protection (insects and fungi).

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[118] Scheuble, R. von (1948) Der X. Kongress des Internationalen Verbandes Forstlicher Forschungsanstalten in Zürich im September 1948. // Mitteilungen-forstlichen-Bundes-Versuchsanstalt, 1948. №45:.0082-0095.

Scientific program

The Congress began its work in the evening of September 5, 1948, with the Permanent Committee meeting in the Swiss Federal Institute of Technology (ETH) in Zurich.

On September 6, Professor Rohn119, President of the Board of the Swiss Federal Institute of Technology (ETH) in Zurich, opened the morning session. In his welcome address, he noted, in particular, that the Swiss Federation spoke different languages, including language of the countries represented at the Congress. He said that Switzerland was a small country, situated in the Alps, and all people were closely linked with the natural conditions of the land. The four borders of Switzerland and its four official languages made its residents to try their best to hear and understand one another.

He also said that the Swiss Federal Institute of Technology (ETH) had been founded in 1855 and had five faculties, one of which was the Forestry Faculty; and that in 1927, a forest area of 210 ha had been made available to the school and had become a 'research laboratory', used by the Forestry Faculty under the leadership of Professor Leibundgut (IUFRO 1948, p.18).

Then, he presented basic information about the country: the total area of Switzerland was four million ha, including one million ha of unproductive land (rocks, glaciers, lakes, etc.), two million ha designated for agriculture, and one million ha, or a quarter of the country's area, covered with forests. Speaking about forest ownership, he said that 5% of forests belonged to the cantons, 68% were owned by communes, and 27% by individuals. The forests of the Swiss plateau fed the national economy, prevented avalanches and landslides, protected the country against floods, erosion, and wind. The therapeutic effect of the forest was difficult to quantify, however, such factors were of a great economic value. According to the statistics of the Federal Forest Inspection, the country harvested domestically about three million cubic meters of timber per year, and consumed four million cubic meters: it therefore had to import a quarter of the wood, and the country thus needed to continuously improve the return from their forests.

In 1843, foresters of the country had established the Swiss Society of Foresters ("Société forestière suisse"). The Society convinced the government and the people that protection and sustainable management of forests would enable them to use all the advantages that the forest could give. Thanks to the efforts of this Society, the Forest School was established, and later, the Federal Forest Research Institute. Thus, forestry education and research were closely interrelated and sought to maximize economic benefits of forests while respecting the laws of nature.

Research should be free from any political or economic influence. In this regard, Professor Rohn expressed his hope that "the neutrality of Switzerland would contribute to it, and that the Congress in Zurich would help to ensure freedom of action of the International Union of Forest Research Organizations, created in 1892, and matured to become able to ensure the success of its activities in global forestry" (IUFRO 1948, p.19-20).

Professor Eric Lönnroth, President of the Union, began his speech in French by expressing, on behalf of Finland, heartfelt gratitude to the Federal Council of the Swiss Confederation for agreeing to host the Congress instead of Finland, which was responsible for organizing the World Forestry Congress in the next year. He noted that the attitude of Switzerland towards this issue was highly praiseworthy. Then, he welcomed the participants of the Congress, and continued his speech in German, saying that the exceptional importance of forests for the global economy and, hence, the need for forest research were the main reasons for the emergence of the International Union. The

[119] Professor Rohn spoke French, but at the end of his speech, he made a few remarks in German and in English. The official languages in Switzerland are German, French, Italian, and Romansh.

goal was set not only to develop international cooperation in this area, but also to increase the visibility of various and numerous proposals and achievements for others as much as possible. The actual year of the Union foundation was considered to be 1890 when the first meeting of scientists and foresters had been held in Badenweiler for this purpose. However, since that meeting had been preceded with the trip to Swiss forests, Switzerland might be also regarded as the homeland of the international network (IUFRO 1948).

Recalling the history of the Union, which had survived after the two World Wars, he stressed that a key objective of the Congress was to define an organizational framework for the Union and its 'constitution' for the future, and that the new times and new far-reaching arrangements also required the reorganization of both the inner and outer life of the Union. So, one of necessary conditions was to revise the Statutes of the Union (ibid., p.24-25).

The third address to the plenary meeting was that of Professor Sven Petrini, IUFRO General Secretary, who said that when Professor Lönnroth had become the IUFRO President in January 1, 1937, he had given a general outline of the Union's development. However, after the reorganization of 1929, "there had been no members and no money at all, only the President, Executive Committee and Secretary General. But in 1937, there were 93 institutional members and 6 new members from 35 countries, (…) the network was formed by 26 national centres of forest bibliography, and there was a list 28 seed breeding centres to provide forest seeds for provenance and other experiments" (ibid., p. 25).

He also said that in addition to the existing committees (on bibliography, on humus and podzolized soils, on resin extraction, timber testing, on forest seeds and forest tree races, and on forest entomology), two more committees had produced some visible results: on description of forest stands and on methods of research on sample plots; and that it had been intended to put in place two more committees (on the breeding of poplars and on problems of erosion) at the Congress in Finland in 1940, but unfortunately, that Congress had not been held. He noted that although progress was not so obvious, the Union did not have to start from the beginning as it had after World War One. In many ways, the reorganization of the Union in 1929 had contributed to this as well as the fact that the Secretary General happened to be in neutral Sweden. He said: "As a matter of fact, today, we can count nearly 50 member institutes, and our savings from the good old times amount to more than CHF 20,000" (ibid., p.26).

He described the work of the IUFRO Secretary General. It included various activities, such as collection of annual contributions, bookkeeping, publication of annual reports, attendance of meetings and conferences and their minutes, and a huge amount of correspondence not only with governments and official institutions, but also with many people outside the Union. Similarly, the responsibilities of the Secretariat included establishing contacts with forestry journals and publishing textbooks; journeys for foresters or students, matters, related to forest seeds, requested or sent from different countries; cooperation between individual scientists or institutions, modern tools and equipment for the work of some research stations and scientists; enquiries relating to the organization and formats for the establishment of institutes and schools in different countries; up-to-date literature, forest dictionaries, translations and abstracts; and exchange of professors and lectures. Many thousands of letters do not reflect the effect to be measured, but they do show the contacts, established and useful to people who needed them.

He also said that in the fall of 1937, in Berlin, the IUFRO Permanent Committee (also known as the Executive Committee) had held a meeting with the new sub-committee on forest seeds and forest tree races. Many questions had been discussed, including, among other things, the agreements between the Union and other (younger than IUFRO), international organizations such as the International Institute for Agriculture in Rome (IIA), the Bureau International de la Protection de la

Nature in Brussels120 and others. In 1938, representatives of other committees on bibliography, on timber testing, on humus and podzolized soils had attended the annual meeting in Finland.

In 1939, the Executive Committee meeting had been held in London and in Princes Risborough, at the same time as a big conference on timber testing. The conference had produced very good results in the area of standardization of testing equipment, methods of research and collaboration with forest science. The Committee had discussed current issues, as well as the proposals on forest statistics, synchronized measuring on old sample plots dealing for international provenance experiments, initiated in 1907. World War Two had upset the plan, and only Sweden had been able to publish the results on the classical provenance samples. The results had been published by the Secretary General in 1942 (ibid., p. 27). Then, Professor Petrini gave a detailed description of the provenance testing at an international scale.

He highlighted other issues and developments, and some extracts from his speech are presented below:

"After the war, the FAO was created as an organ of the United Nations, and the Secretary General tried to get in touch with their Division of Forestry and Forest Products. This contact was established, but only during this year, 1948. [Since then] the discussions about collaboration formats have really gone from sounds to things. In the meantime, the Union succeeded in arranging an international conference in Finland last autumn where the Permanent Committee and the Commission on Bibliography were reorganized and where a proposal for collaboration with the FAO was formulated. After correspondence and personal discussions where Professor Saari, Finland, who is closely connected with them both, has been a link between the two organizations, a definite proposal came to us from the FAO. This Congress will take a decision on this matter which represents the most important and actual question we have to address during these days. By the collaboration with the FAO, the Union will have much to gain, because France as well as the federal forest research stations in the U.S. will join the Union only on that condition…

"We now stand before the second re-organization of our nearly 60 years old Union of Forestry Scientists. It is well understood that science needs freedom for its development, and that the Union shall not act as a directorate, tying the hands of scientists. The Union has to rule itself through the representatives we ourselves choose. The organs created by the Union shall serve the mutual interest, they shall aid and stimulate more than lead. We have to remember that the essential work is done by the individual institute members themselves, not by the Union as a body. Our correspondence, conferences, group meetings, and congresses are meant to further and facilitate the work done in countries, but not to create complications. The international conditions nowadays are not so easy to handle as they were, and especially the political conditions form delicate problems. So much the better for us, scientists, that we principally and in practice must refrain from politics. We have always done so and we have to continue keeping always from ideologies, propaganda and nationalism. In science, we are all world citizens, dwelling in the clear atmosphere of pure facts and clean intellectual reasoning, trying to repress the emotions. In this sense I express my great happiness seeing the Congress assembled here in this hospitable and traditionally neutral country after so many years of broken relations" (IUFRO 1948, pp.28-29).

In the evening of September 6, the plenary session of the Congress heard two presentations: Mr. W.H. Guillebaud, Deputy Director General of the Forestry Commission (Great Britain) on the problems of afforestation in Great Britain, and Professor H. Pallmann, Rector of the Swiss Federal Institute of Technology in Zurich, on the relationship of soil science and plant sociology.

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[120] Bureau International de la Protection de la Nature established in 1934; in future, the International Union for Conservation of Nature – IUCN = Union internationale pour la conservation de la nature – UICN.

On Wednesday, September 8, 1948, at the morning plenary session, further discussions were held in the special committee. At the second meeting, Professor Giacomo Piccarolo of the Institute for Poplar Breeding Research, and Mr. Casale Monferrato (Italy) delivered a presentation on the experience of growing plantations of poplar; and Professor M. Ros, President of the Board of the Swiss Institute for Testing Materials, Zurich, told the audience about the current status and prospects of wooden structures in civil engineering.

The sessions were few because of the need to save time, but also for the reason of a serious discussion of the issue and the need to make changes in the organizational structure of the Union. The commissions' meetings discussed current issues and plans for the future.

At the meeting of the subcommittee on forest bibliography, Professor H. Burger, its chair, said that the Flury system was a compromise and that it (as well as other systems) was not free from deficiencies. The refusal to use the scheme would mean that the 25 years of Flury's work would be deemed useless. However, the work, done by F.C. Ford-Robertson and P.G. Beak, was found to be successful. Collaboration with the FAO and, possibly, with UNESCO would bring this trend to a higher level. This work would benefit from involvement of Professor Saari from Finland, who became a member of the FAO Forestry Department, but remained the head of the IUFRO subcommittee. It would be desirable that IUFRO continued to coordinate the joint commission.

Professor K.A. Meyer from Switzerland, who had the longest experience of working on this issue, repeated that any scheme was a compromise, and that it was impossible to create an ideal one. It seemed that even the perfect modern option would be out of date in a few decades. He commended the excellent work, done by Robertson and Beak, and said that if the decimal classification was introduced, Flury's system could be extended indefinitely.

Director Dr. Rudolf Scheuble from Austria also defended Flury's scheme, but noted that much could be added there, such as a section on hydrolysis of wood. He showed the Austrian bibliography, containing abstracts (without codes), made in accordance with Flury's classification (Mitteilungen der forstl. Bundesversuch-sanstalt Mariabrunn, Nov. 1947), and suggested that the authors should include in their publications a bibliography and abstracts in the main IUFRO languages. The President supported this proposal.

Director Dr. F.C. Ford-Robertson explained why the Oxford system required modifying Flury's scheme. These conclusions were based on 10 years of experience with the scheme. Flury's scheme had been applied since 1934; however, there was a need to change and expand it to meet the needs of all forest offices and research institutes of the British Commonwealth of Nations. He asked for a speedy review and approval of the scheme, since the expansion should not be postponed until a later date.

Director Scheuble said that the Institute at Mariabrunn used Flury's scheme despite the fact that Austria had its own scheme, designed by Klimesch. All the card files were constructed in accordance with the Swiss classification.

Professor Alessandro de Philippis (Italy) expressed the view that it would useful to have both detailed division and abstracts of publications. In this regard, F.C. Ford-Robertson noted that the exchange of index cards could be dropped as soon as publications were issued with the abstracts. Professor K. Cermàk (Czechoslovakia) pointed out that a detailed discussion was unproductive at that time, because everything had to be agreed with the FAO. For the countries, using more than one national language, the expression "world languages" should be reconsidered. He also demonstrated excellent publications from Prague.

After the discussion, Assistant Director P.G. Beak (Great Britain) answered numerous questions. The Chairman noted that the publication of abstracts in the Oxford system in French and German was highly desirable, but it should be addressed together with the FAO. He regretted that the exchange of abstracts was still possible only within the Commonwealth.

Director F.C. Ford-Robertson again asked to review his scheme in the near future to see if his scheme agreed or not. In addition, he made two suggestions: 1) the sub-committee should propose to set up a small permanent committee, designated by the International Committee to regulate any increase or change of the classification. All scientists, wishing to join this committee or to create new divisions, should submit their proposals to the above mentioned committee for review; and 2) each member country should encourage authors and publishers to include abstracts in their publications. Abstracts of the more important publications should be printed: (a) in the language of the publication, and (b) if the language is not English, French, German or Spanish, the publication should include an abstract in one of these languages (IUFRO 1948, p. 213-214).

At the end of the meeting, the President said that the meeting had unanimously voted for the proposals and indicated that those should submitted to the body of the higher level. This was because the sub-committee on bibliography might not make such a decision when a new joint bibliographic committee was expected to be established and to consist of representatives from IUFRO, FAO and, most likely, UNESCO. If the Union could chair the committee, Professor Saari should be nominated for this post for the reasons mentioned before.

Organizational matters

It should be noted that the importance of forest bibliography was recognized at so high a level that a separate section on efforts in this area was included in the Agreement between IUFRO and FAO (IUFRO 1948, p. 261-262).

Agreement
between the Food and Agriculture Organization of the United Nations and
the International Union of Forest Research Organizations

The partners are bound by the English text

The Food and Agriculture Organization of the United Nations (hereinafter called “the FAO”) and the International Union of Forest Research Organizations (hereinafter called “the Union”) have agreed as follows:

I. Objectives

The FAO and the Union undertake to collaborate with each other in accordance with the terms of this agreement, for the furtherance and improvement of forestry, the forest industries and research work concerning them.

II. Status of the FAO

1. The FAO shall be invited to the Congresses of the Union and shall assist the Union in organizing such Congresses.

2. The FAO may participate, in an advisory capacity and in accordance with the Statutes of the Union, in the work of the International Council and the Permanent Committee of the Union.

3. The FAO may make suggestions concerning the activities of the Union and of its organs.

4. The FAO shall consider giving the Union such financial assistance as may be necessary

a) to carry out specified research projects of mutual concern;

b) to publish the results of investigations approved by the Union and the FAO.

III. Status of the Union

1. The Union shall be invited to the Conferences of the FAO.

2. The Union may appoint observers to all forestry and forest products technical committees of the FAO.

3. The Union shall assist the FAO in carrying out such FAO research programs as are in accordance with the aims and program of the Union.

4. The President of the Union may designate any member of an organ of the Union to represent the Union in its dealings with the FAO.

IV. Joint Committee

1. The FAO and the Union shall collaborate in the development of an international bibliography of forestry and forest products, and to this end the FAO and the Union shall establish a Joint Committee on Bibliography.

a) The Joint Committee on Bibliography shall submit recommendations to the appropriate authorities of the FAO and of the Union.

2. The FAO and the Union may establish joint committees on other matters of mutual interest.

V. Secretariat

1. The FAO agrees to assume the duties, and to defray the expenses, of a Secretariat for the Union.

a) Such Secretariat shall be managed by a trained forester attached to the Division of Forestry and Forest Products of the FAO at its Regional Office for Europe.

2. The details of the work of the Secretariat shall be arranged between the FAO and the President of the Union.

3. The Secretariat shall

a) provide the President of the Union, upon his request at any time, with detailed information as to the affairs of the Union handled by the Secretariat;

b) make an annual report for the information of the Permanent Committee of the Union.

VI. Effective Date and Termination

1. This agreement, having been approved by the competent organs of the FAO and the Union, shall be effective as of January 1st, 1949.

2. This agreement may be terminated by either party hereto upon six months' written notice to the other.

Washington, March 18th 1949.	Helsinki, November 11th 1948.
Norris E. Dodd	Erik Lönnroth
Director General	President of the Union

A special commission on forest sites/localities (Leader: Mr. H. Pallmann, Switzerland), the Commission for research of the tree seed origin (Leader: Professor G. Piccarolo, Italy) and the Commission for wood research (Leader: Professor M. Levon, Finland) discussed the proposals to be presented to the Permanent Committee (see the *Congress Resolutions* Section).

In the afternoon of September 6, 1948, one representative from each country participated in the International Committee meeting.

In the morning of September 7, 1948, the second meeting of the International Committee was held, and in the afternoon, there was a meeting of a special committee which could be attended by any interested person.

In the evening of September 8, 1948, Dr. Philipp Etter, Member of the Swiss Federal Council and Minister of Interior[121] from Bern, made a speech during the reception in honour of the delegates. In his speech, he read out the message of the Federal Council to the Congress. He also said: "the Congress is a living image of the forest - the forest where we find oak, beech, ash, birch, spruce and various tree species' coexistence and cooperation. Each tree has its own personality, its own earth, the light and the sun, and yet they are united in the same forest. Today, you are united here – the

[121] Forestry and forest policy issues were part of the functional responsibilities of the Swiss Federal Department (Ministry) of the Interior.

representatives of various European nations, and each of you rooted in your country, belonging to the history, the tradition and the spirit of your country… We, Europeans, belong to our own counties, rooted in our own countries, but we also belong to one family - we are united in one family like trees of the forest, the family with its common challenges and responsibilities, joint efforts and successes" (IUFRO 1948, p. 32).

He noted that for almost 60 years, IUFRO promoted international cooperation, doing so from its heart, but the persistence of this work required full autonomy of research institutions because scientific work was possible only in the atmosphere of freedom. Healthy forests and forestry were among the most important foundations for healthy global economy, and in the post-war world, it was even more perceptible.

In the final part of his speech, Dr. Ph. Etter remarked that the forest was one of the fundamental elements of the Swiss democracy. He said: "We have no national forests. The forests, which we regard as our Swiss forests are privately owned by farmers, they are the cantonal government forests and communal forests. Swiss communities are the major forest owner. The autonomy of the community is one of the mysteries and one of the fundamental forces of the Swiss democracy. So, the eternal forest is the backbone of our Swiss democracy, and foresters work for those who come after us, and the actual beneficiaries of the work will be only our grandchildren in the third and fourth generation" (ibid., p. 33-34).

On Saturday morning of September 11, 1948, the International Committee met for last time during the Congress, and in the afternoon, the final plenary session was held.

The Congress established 11 research sections where scientists from member organizations could freely participate. It was a very valuable approach because working groups helped to broaden, intensify and deepen the relations among scientists and, in general, they were conductive to the development of international cooperation.

The Congress approved the second re-organization of the Union and adopted its new Statutes (IUFRO 1948, p. 254-256):

International Union of Forest Research Organizations
Statutes of the Union

Article 1. The name of the association is: "International Union of Forest Research Organizations".

The Union collaborates with the Food and Agriculture Organization of the United Nations (FAO), with the United Nations Educational, Scientific and Cultural Organization (UNESCO), and with other international organizations. Its legal seat is the residence of the President.

Article 2. The aim of the Union is to promote international cooperation in the various branches of forest research. It exercises its activity especially:

(1) By facilitating in different countries exchanges of opinion and an understanding among research workers specialized in the various forestry problems, in particular for the purpose of establishing common research programs and a collaboration in their execution;

(2) By periodically summoning meetings which may be combined with excursions for the purpose of studying forestry;

(3) By working, as far as possible and expedient, for the introduction of uniform nomenclature and standardization of methods in forest research work;

(4) By providing for the establishment of an international Forestry Bibliography.

Article 3. Two classes of membership are recognized, (a) Ordinary Members, and (b) Associate Members.

(a) Ordinary Members shall be of two classes:

(1) State-established Forest Research Organizations. These become members of the Union merely by giving notice to the President of the Union of their intention to join.

(2) Organizations carrying on the same kind of work as State-established Forest Research Organizations and founded by Universities or other corporations. These may be elected ordinary members, upon the nomination of the representative of their country (Article 6, paragraph 1) and on the proposal of the Permanent Committee, by a resolution passed by the International Council.

(b) Associate Members shall be private individuals engaged in forest research. They may be elected by the Permanent Committee upon the nomination of the representative of their country, subject to the ratification by a two-thirds majority of the International Council.

Article 4. The organs of the Union are:

(a) The Congress,

(b) The International Council.

(c) The Permanent Committee.

(d) The President and the Vice-President,

(e) The Secretariat.

Article 5. The Congress, which is the general assembly of the Union, discusses scientific forestry questions:

It consists of:

(a) the members, mentioned in article 3,

(b) any persons, engaged in forest research receiving a special invitation.

Every ordinary member of the Union has the right of being represented by as many delegates as it chooses.

The Congress meets every three to five years on the initiative of the President.

Article 6. The International Council, which is the highest authority for all matters of organization and management, shall consist of one representative from each country, that has any ordinary member in the Union, or from which a request for admission has been addressed to the Union.

The Director of the Division of Forestry and Forest Products of the FAO or his representative may attend as an Observer. The countries shall be differentiated according to the same principles as those applied in the Universal Postal Union. The representative of each country should be a person engaged in forest research.

The International Council shall meet generally only in connection with a Congress. It can, however, meet in an extraordinary session either upon call by the president or al the request of one third of its members.

It fixes the program of work of the Union.

It fixes the year of the next Congress and the country in which it is to be held.

It elects the President and the Vice-President of the Union and the members of the Permanent Committee.

It fixes the minimum of the annual subscription in Swiss francs.

It examines the report of the Permanent Committee and the accounts of the Union.

It decides finally the action to be taken upon the proposals submitted by the Congress and its sections, as well as the admission of the members mentioned in Article 3-a-2 and 3-b.

It has the right of appointing special comissions on which experts who are not members of the Union may be invited to sit.

Every ordinary member of the Union has the right to bring before the International Council any individual proposal concerning the work of the Union and to have such proposal presented to the Council by its representative.

Article 7. The Permanent Committee, which is tie executive organ of the Union, shall consist of the President, the Vice-President, and five to seven members; it shall be elected by the International Council by a majority vote. A representative of the FAO shall also be entitled to sit on it as an Observer. Its period of office shall be from the first of January of the year following the close of the Congress during which it is elected, to December 31st following the next Congress.

Besides the elected members, the retiring President continues to be a member of the Permanent Committee until December 3lst following the next Congress. The Permanent Committee has the responsibility of managing the financial affairs of the Organization.

Article 8. The Permanent Committee may appoint a technical adviser whose duties shall be:

(a) to act as personal assistant to the President,

(b) to be rapporteur at the meetings of the International Council and the Permanent Committee,

(c) to prepare the reports on the scientific activity of the Union.

Article 9. The President shall preside over the Congress, over the International Council, and over the Permanent Committee. His term of office shall be from the first of January of the year following the close of the Congress during which he is elected, to the December 31st following the next Congress. He shall be eligible for re-election.

If the office of President becomes vacant between two Congresses the Vice-President shall act as President until the next Congress.

Article 10. The International Council shall appoint two auditors and two deputy-auditors, or an Auditing Firm of good reputation to proceed with the auditing of the accounts of the Union.

Article 11. The Permanent Committee shall fix the organization of the Secretariat of the Union; it may empower the President to sign a formal Convention regarding the organization of the Secretariat.

Article 12. All subscriptions shall be due on 1st January of each year, and shall be paid by 3lst January. The whole annual subscription is due in the year of admission. Members in arrears for over three years shall lose their membership. The Permanent Committee shall decide to whom and where the annual contributions shall be aid.

Article 13. The decisions of the International Council shall be taken by a simple majority of the votes cast, provided that they are approved by at least one third of the entire membership of the International Council.

Any change in the Statutes of the Union, or in the amount of the annual subscriptions, as well as in the application of the provisions contained in Article 3, paragraph b, requires a majority of two-thirds of the entire membership of the International Council.

Article 14. The collaboration of the Union with the international organizations shall be fixed by conventions.

These shall be signed by the President, after having been passed by the Permanent Committee, in agreement with the principles accepted by the International Council.

Approved by the International Council at the Congress of Zurich, September 5-11, 1948. Became valid since the first of January 1949.

Helsinki, 2. November 1948.

Signed by: *Erik Lönnroth"* (IUFRO 1948, p. 254-256).

It should be noted that the Union returned to the word «forest» instead of «forestry» in its name for the sake of attracting not only organizations of forestry but also of forest industry. A few important changes occurred, such as establishing the International Committee and the Permanent Committee, introducing the Vice-President position, and approving eleven research sections. The IUFRO Permanent Secretariat was established. It was based in the UN FAO headquarters (Rome, Italy), and the FAO received an observer seat at IUFRO. Due to the changes in IUFRO's priorities,

the members of the Bibliographical Commission were no longer members of the Permanent Committee (Article 6 of the Statutes).

At the final meeting of the International Council, the following members of the Executive Committee were elected: Professor Hans Burger, Director of the Federal Forest Research Institute, Zurich, Switzerland – President (1949-1953); Professor Aldo Pavari, Director of the Forest Research Institute, Florence, Italy – Vice-President; members of the Board: W.H. Guillebaud, Deputy Director General of the Forestry Commission, London, Great Britain; A. Oudin, Director of the National School of Water Resources and Forestry, Nancy, France; Dr. H. van Vloten, Director of the Forest Experiment Station, T.N.O., Wageningen, Netherlands; St. Schabinski, Director of the Forest Research Institute, Warsaw, Poland, who was replaced by M. Kreutzinger, and Professor O. Buresch Sagner, Buenos Aires, Argentina, who was replaced by O.L. Giacobbi, Director of Forest Research, Buenos Aires[122]. According to the Statutes (Article 7), former President Erik Lönnroth (Rector of the University of Helsinki, Finland) was also a member of the Permanent Committee. One more member, C.F. Korstian, Dean of School of Forestry, Duke University, Durham, USA, was co-opted later. Two more persons could participate in the Permanent Committee meetings: Professor S. Petrini, Swedish Royal Forest Experiment Station, Sweden, who became, as previously, the Secretary of the Union (Scheuble 1948) and whose position was later renamed and occupied by Technical Advisor [123] H. Etter (Federal Forest Research Institute, Zurich, Switzerland); and I.T. Haig, Head of FAO Department of Forestry (FAO, Rome, Italy) as an observer.

Resolutions

The reports of the four committees were presented at the Congress, and respective decisions were adopted on them.

The sub-committee on bibliography concluded that the previously accepted bibliographical scheme, elaborated by Flury, was a trade-off, and it was difficult to implement. However, it was noted that the bibliographical commission would not create a scheme, as the new one would be developed jointly with FAO. It would be desirable that such a joint commission included representatives of the UNESCO as well. The following propositions were endorsed: 1) to establish a permanent sub-committee on forest bibliography and to collect proposals on its work; 2) to identify a person to head the sub-committee. If the sub-committee head was a representative of IUFRO, the candidacy of Professor Saari (Finland) should be supported because he represented his country in the FAO and was a member of the Union; and 3) to allow abstracts of articles to be published as established. The Member States of the Union should cause authors, or rather, publishers to provide abstracts to any contributions. Each publication would have an abstract in its language of origin, and if it is not English, French, German or Spanish, the publication should have an abstract in one of the four languages. Meanwhile, these were endorsed propositions rather than adopted "decisions, because a new common bibliographical commission of representatives of the Union, the FAO and the UNESCO should first be elected" (IUFRO 1948, p. 214).

The Committee for forest sites submitted the following resolutions to the Permanent Committee:

"1. The proposition is submitted to the Permanent Committee, that in the future, the sphere of work of the existing special committee should comprise studies of soils, climate, vegetation and production. Accordingly, the name of the former sub-committee for podsol and humus shall in future be changed into 'Sub-Committee for forest sites'.

"2. The following gentlemen are proposed to the Permanent Committee as members of the

[122] There was no person from the Argentina in the list of the Congress participants in 1948 (IUFRO 1948).
[123]A person who expressed the willing to work in this capacity, mostly without remuneration.

sub-committee: H. Pallmann (President), V.T. Aaltonen, G.W. Dimbleby, H. Etter (Secretary), A. Galoux, Y. Ilvessalo, A. Oudin.

"3. All members of the sub-committee shall collect available literature, concerning root-competition, divining-rod and site-mapping, and transmit it to the Secretary. He will communicate the results to all members.

"4. A dictionary for technical terms in soil science (suggested by Director A. Oudin): a dictionary in English, Russian and German, prepared by Professor Aaltonen is ready for press and will be sent to Messrs. Pallmann and Oudin. An exchange of opinions on this subject shall take place within the sub-committee before the next international congress of soil scientists" (IUFRO 1948, p. 218).

The Committee for studying seeds and races submitted the following proposals to the Permanent Committee:

"1. As soon as possible a Committee for genetics of forest trees should be created.

"2. It is desirable that representatives of the research organizations for the study of genetics of forest trees in America and Southern Europe should also be integrated into this Committee.

"3. The Committee should meet as soon as possible, let say in the course of 1949. At this meeting, the members have to deliberate upon concrete proposals concerning the international collaboration, giving them a definitive shape referring to the methods of general genetics in forestry as well as to the identification of stands and single trees for seeds harvesting.

"4. All the results, earlier collected by the Committee, including the Institutes for testing of seeds, should be published together" (IUFRO 1948, p. 220).

The Committee for timber testing "discussed the need of classifying the problems in forest research with regard to the general aspects of producing, harvesting and utilizing forest products and forming sub-committees to address the respective research problems.

"With this aim in mind, the problems of forest utilization were discussed more thoroughly and the following classification was proposed:

"*Group: Harvesting of forest products* – Comprising felling, hauling, assorting, piling and transporting the timber, harvesting and transporting other forest products such as bark, and resin, in so far as operations in the wood or on the way to the place of manufacturing are involved.

Group: Mechanical-technological utilization of forest products – Comprising the use of wood as raw material without changing its structure.

Group: Chemical-technological utilization of forest products – Comprising the use of wood for combustion and locomotion, the metamorphosis of wood under partial or total change of its structure, and the manufacture of substance from wood or other forest products." (IUFRO 1948, p. 222).

Excursions

On September 9 and 10, 1948, the following six tours through the demonstration forests and sample plots were offered to the participants. The brief description of the tours (below) is based on the Congress report (IUFRO 1948, pp. 209-250).

Route 1: The demonstration forest of the Forest School of the Swiss Federal Institute of Technology (Led by: Professor H. Leibundgut). The aim of the tour was to demonstrate silvicultural concepts in Switzerland.

In 1927, the Swiss Confederation bought the Albisrieden forest, located mostly on the northern slope of the Mount Üetliberg between 475 to 840 m above sea level[124]. The forests covered 210 ha. The main goals of the Forestry School were research and training of forestry students on a regular basis, as well as testing to study the interaction of various forest sciences and to ensure

[124] The highest point of Üetliberg is 869 m a.s.l.

continuity of results of experiments and their development. Such forests also gave an opportunity for practical forest management which would gradually become a model of forest administration.

On September 9, 1948, at 9:00 a.m., the participants departed from station Selnau to Waldegg, visited the Demonstration Forest, had lunch on the top of the Üetliberg, drove through the Sihlwald, visited the forest and some sample plots of the Swiss Forest Experiment Station and of the Swiss Forest School, and returned to Zurich.

The first site was a high forest, aged 80-100 years: it was a beech stand with inclusions of silver fir, spruce and pine. Until 1927, the stand had been under continuously exposed to strip felling of low intensity in the direction from east to west and reforestation with spruce. Since the establishment of the demonstration plot, the strip felling was stopped. The forest manager tried to improve the growth conditions and the quality via selective thinning. Current annual growth was estimated at about 10 m3/ha. Available undergrowth was generally regarded as soil protection and a source of secondary crop. In accordance with the Swiss group system, reforestation was limited to physically accessible forest areas. On the same site, unsuccessful experience was demonstrated to show unsuitableness of cultivation of even-aged oak with spruce. Since the 20-30-years-old spruce plantation supressed oak, spruce trees were removed through gradual selected thinning.

"A 70-80 years old spruce stand with gaps from windfall, defects from fungi and other damages demonstrated clearly how justified the natural composition of stands was. The soil-profile already indicates a beginning degradation of the soil. Thus here, spruce plantations, ill-suited for the site, are no warrant for sustained yield. The stand is very carefully thinned, in order to take possible advantage of growth vigour. The conversion into a stand adapted to the site (mixed hardwoods with pedunculate oak) is intended only later on" (IUFRO 1948, p.226).

"The principles of the Swiss group system were exposed in compartment 2. In a 90-120 years old beech-stand the best formed trees (beech, larch in single mixture) were developed and gradually set free by a systematic selective thinning. The first centres of regeneration were created on the limit of transportation. The rest of the extremely abundant undergrowth is disregarded. The treatment aims at a full utilization of the increment of the good trees (highest effect in value) and the creation of first-rate hardwood-regeneration with admixture of single groups of conifers (larch, spruce)" (ibid, p.227).

In the next section, the participants received an explanation of a detailed plan of the thinning in chaotically scattered groups of spruce and coppice. The forest management planning, coordinating all silvicultural activities relative to space and time, depended on a vegetation map, a map of the stands and an operation map. After drainage of the swampy areas with spruce stands, the soil was deteriorating. It was noted that if the artificial drainage was stopped, the hardwoods typical of such growing conditions (mainly alder) could return successfully. The group also discussed the advantages of the stands established in accordance with the natural conditions of growth. The soil was excellent for conditions, created by all kinds of mixing hardwoods suitable for the site. The stand development through systematic thinning in coppice gave positive results within 30-40 years. The tour ended with a visit to a greenhouse and experimental nursery.

Route 2: Thinning experiments in Sihlwald.

In 1907, the Forest Experiment Station established three sample plots in 18-21 years-old natural stands of beech, ash and maple with spruce and fir trees planted between them. The study was to monitor the effect of cleaning and thinning on the productivity and quality of the forest stands. One section was left untouched (control); in the second section, the undergrowth was thinned; and the third sample plot was thinned according to the principles of crown thinning.

The results showed little difference in areas except for the areas affected with the strong snow break of May 23 and 24, 1908. By the end of 1947, the total growing stock in the control (untouched) area reached 787 m^3, 788 m^3 in the second plot with medium intensity thinning (C-area), and 769m^3

in the area, thinned from above (H-area); the average increment from 1907 to 1947 amounted to, respectively, 16.2, 15.9 and 16.1 m^3. The increment was not influenced by the treatment.

In the control section, the conifers remained suppressed; in the second section, most of spruce and fir trees were in the state, corresponding to the theoretical assumptions and had to be removed; on the third section, softwoods could be freed from shading. In 1947, it was found that the share of the coniferous growing stock (with at least 7 cm diameter) in the total growing stock amounted to only 1% in the control section, 10% in the C-area, and 26% - in the H-area.

Selective thinning from above had positive impact on not only the conifers, but also on the deciduous trees of the first-class growth. Furthermore, trees with good form stems covered up to 78% in the H-area, some 49% in the C-area and even 32% in the control section.

The thinning of the stands for over 40 years had no much impact on the increment, but the thinning from above considerably improved the growth of higher quality timber, representing its much higher cost, and thus showing the value in the treated stands.

Route 3: Selective thinning on sample plots in Birriboden Sihlwald.

In the 1920s, foresters actively discussed the frequency and intensity of thinning. They hoped to increase the total growing stock and improve the quality of stands through frequent and intense thinning. Professor Dr. Walter Schädelin, teacher of Professor H. Leibundgut, believed that the relatively frequent repetitive thinning could improve the response of individual trees and allow rapid accumulation of growing stock due to a gain from the best trees. In 1930, he laid six sample plots, three of which were thinned every second year, while the others were treated once in every six years according to the principles of selective thinning of the Swiss silvicultural system. After several thinning efforts, it became clear that the two-year cycle was too short because the periodic thinning of even low-intensity created too much impact on final crop. Later, in connection with the war, additional thinning attracted attention to define acceptable intensity of thinning. Early thinning was practiced without regard to its intensity, and in each case, the foresters defined their actions on their own on a case-by-case basis in order to get the maximum volume of high-quality wood.

On the sample plots in Birriboden, the experimental thinning showed that the overall increment was almost the same in the compared areas, although the treatments were substantially different. The intense selective thinning was reflected on the average tree diameter and volume (which the purpose of thinning); it gave an increase in the absolute terms and the share of the volume of the most valuable timber in the total growing stock. The relatively short period of 18 years proved the possibility of significant improvement of the wood quality by thinning, according to Schädelin. Thus, the intensity of thinning for obtaining high-quality wood was about the middle between the high and low intensity.

On September 10, 1948, two excursions were offered to participants at the same time with early departure: silvicultural excursion to Eglisau and technological excursion to Zug.

The participants of the silvicultural excursion went to the sample plots, laid by Professor Dr. Arnold Engler, former Director of the Swiss Federal Forest Research Institute[125]. Then, they visited the state forest of Rheinau and the communal forests of Marthale, and after lunch in the Laufen castle near the falls of the Rhine, they proceeded to the pine forests at Eglisau.

[125] Professor Dr. A.Engler is the author of several classical publications, including: (a) the influence of the provenance of the seeds of Scots pine: Summary of results achieved so far by the Swiss forest experiment station [Engler, A. (1910) Influence de la provenance des graines du pin sylvestre: Récapitulation des résultats obtenus jusqu'ici par la Station suisse de rocherches forestières. Rapport présenté par m. Arnold Engler… – Bruxelles, Imprimerie scientifique, C. Bulens, 1910. – 14 p.], and (b) the research initiated in 1902 on the forest influence on the status of waters [Engler, A. (1919) Untersuchungen über den Einfluß des Waldes auf den Stand der Gewässer. – Mitt. Schweiz. Anst. f. d. Forstl, Versuchswesen, XII. – Zürich, Beer, 1919. – 1-626 pp. (Mitteilungen der Schweizerischen Centralanstalt für das Forstliche Versuchswesen (Vol. 12), Zentralanstalt für das Forstliche Versuchswesen Zürich)].

Route 4: Silvicultural excursion to the 5th forest district of the Canton Zurich.

The group visited the state forest and the communal forests of Rheinau and Marthalen.

In the first site, the plots were located on moraine gravel soils at an altitude of 360 m, with about 900 mm of annual precipitation. It was an old clear-cut area with planted pine and spruce. At the age of 40, it showed significant defects, including decreased growth, low density, and severe damages as well as beginning soil deterioration. Another plot represented oak-hornbeam stands (former coppice) with old pines, aged about 150 years, in mixture with oak, lime and hornbeam. The third plot with dense natural regeneration of 7 years old showed the desired mixture of pine oak and hornbeam. The stands were under treatment (cleaning in mixed stands according to Schädelin).

The second demonstration site was a plot with former coppice of big pine trees, aged 150 years, which was a good source of seeds with an understory of oak.

The third site, classified as Querceto-Carpinetum aretosum, represented two plots of mature timber from former coppice and displayed natural, rich mixture of species, including pedunculate oak, ash, hornbeam, common alder, cherry, lime tree, maple, mountain elm and others with understory of hornbeam and oak. The other plot of this site demonstrated an oak stand, aged 20-25 years after selective thinning according to Schädelin. The objective was to produce a good form of stems in the upper storey by means of cutting the competitors.

Rout 5: Provenance study plantations of pines of different origins, Eglisau.

The objective was to demonstrate the results of the comparative plantation with pines of different origins. The plantations had been established by Professor Arnold Engler in 1908 and 1909 at Eglisau. The current conditions of the stands, from the forest health point of view, showed that the pines had been affected by pine needle-cast (a fungal disease) with different levels of damage: pines from the Alps were heavily damaged; a medium degree was found in pines from southern Germany, northern Switzerland and southern France; and minor damage was found in pines from eastern Prussia, Russia, Sweden and Norway. Young pine stands of the continental races from Russia, Sweden and Norway had visible yellow colouring during winter.

From the forest management point of view, pines from southern Germany, Belgium and northern Switzerland grew well (with high increment in diameter and height), although the increment was substantially smaller than that of the pine trees from the seeds from Norway, Sweden, Russia and the Alps. The tree stem quality in the descendants could be described as follows: good forms of the stems in trees from the seeds from Norway, Sweden, eastern Prussia, Russia and Riga (Lithuania); medium form quality in trees from the seeds from southern Germany, northern Switzerland, Belgium and Tessin; bad shapes, such as crippled pines from the seeds from Bonaduz and Tiefencastel. It was demonstrated that “within the same site-race, well-shaped mother trees produced better shaped descendants than trees with bad forms” (IUFRO 1948, p. 246).

Professor A. Engler’s experiments clearly showed that the resistance of pine to needle-cast disease, its increment and form of the stems could be hereditary. The pines from eastern Prussia gave the best results. At the same time, it was difficult to choose between the well-shaped, but slowly growing pine trees from southern and central Sweden, Norway or Russia, and fast growing, but poorly-shaped descendants of pines from southwestern Germany or northern Switzerland. But still, it was difficult to determine the effect of selective thinning on the stem shape and quality.

In mixed stands where the beech performed well in comparison with the slower growth of pine-races, the pine trees could be threatened with early introduction of the beech under the canopy. Ultimately, it was better to introduce beech trees at a later stage, or to plant slower growth tree species, such as hornbeam. The participants of the technological excursion drove to Cham. After visiting a fibreboard factory and lunch at Zug, they went to a demonstration site to see new devices for hauling timber on slopes at the Zugerberg.

Route 6: Timber industry and technology in the Kanton of Zug (Led by Professor Knuchel). About 25 participants of the Congress visited the Pavatex SA [Ltd.] fibreboard factory (a subsidiary of the Cham SA paper mill). They were divided into two groups, and each was led by the director of the company: A. Schlatter and Dr. H. Ehrensberger. The delegates visited the lower landing and saw stages of chemical wood-processing during fibreboard making – from defibration (making fibre of wood) to the final product, as well as discussed wood quality and technical properties of fibreboard.

In the afternoon, the participants were acquainted with logging operations of the Stutz division of the corporation forests on steep slopes of the mountain of Zug. In such an environment, the main tasks were to construct good roads and improve the harvesting practices to enhance forest management. In particular, good roads would enable the halting of the practice of skidding through rolling the logs on steep slopes, as it caused serious damage to forests. Then, the participants saw the techniques and tools, used for felling and skidding on slopes. The Central Bureau of Forestry in Soloturn had developed a special device (a steel rope ware) to pull the logs downhill without damage to the stands and logs. Using a motor-cable winch, the logs were pulled uphill. These demonstrations showed that endeavours to assess and improve forest operations in Switzerland had already given practical results.

Soviet/Russian participation

Scientists form the USSR did not participate in this Congress. The reason was quite clear: three years later, the most devastating war in global history ended, and the USSR lost not only tens of millions of people, but also thousands of scientists. Many research facilities, sample plots, equipment, libraries, archives, research reports and documents were destroyed or lost. So, the post-war time was not favourable for such events because after coming back from battlefields, Soviet scientists began to restore research infrastructure, sample plots, and documentation.

Another reason was that only one Soviet forest research institution had joined IUFRO, it was the Institute of Forest and Wood of the Academy of Sciences of the USSR. The Institute was established in Moscow in the war year of 1944 by Vladimir N. Sukachev, outstanding Russian biologist, forester, geographer, palaeobotanist, Academician, who had foreseen the necessity of forest research in the academic community, and especially for practical application of its outputs to meet the reconstruction needs of the country's economy. This Forest Institute became the first forest research institution under the Academy of Sciences of the USSR, and in 1947, it became the first IUFRO member from the Soviet Union. In 1959, the Institute was relocated to Krasnoyarsk and became part of the Siberian Branch of the Academy of Sciences.

Ironically or not, the Institute was named after its founder and first Director V.N. Sukachev in 1967 – the year of 20th anniversary of its IUFRO membership. Now, it is the Institute of Forest, Siberian Branch, named after V.N. Sukachev, under the Russian Academy of Sciences.

Interesting facts

In 1948, the United Nations had 59 Member States. Actually, it was rather a European Congress because all 16 countries were from Europe, and the post-war period left its mark on the list of participants.

Chapter 16
Congress XI - September 22-26, 1953, Rome, Italy

Information for this Chapter was drawn mainly from the Proceedings of the 11th IUFRO Congress, published in 1954 in Florence by the National Agency for Pulp and Paper together with the National Research Council (IUFRO 1953).

Overview

In the Preface to the Proceedings of the IUFRO Congress, President Aldo Pawari noted that 153 representatives from 97 organizations in 20 countries had attended the Congress. At that time, the Union had 94 ordinary member organizations in 40 countries. Germany, as in previous years, was represented by the largest number of delegates – 36 participants. Much fewer delegates were sent by the host country – Italy (12), and other countries, such as Sweden (11), Yugoslavia (10), France, the Netherlands (9), Austria, the United Kingdom (7), Belgium, Switzerland, Turkey (6), Norway, Finland (5) Denmark (3), Morocco, Japan (2), and one delegate from the Argentina, Israel, Kenya and the United States. In 1948, after signing the Cooperation Agreement between IUFRO and the FAO, the Congress was attended by 13 observers from the FAO (IUFRO 1953).

The Congress Organizing Committee included several honorary members: Mr. Salomone, Minister of Agriculture and Forestry, Dr. Sacchi, Director General of the Department of Mining, Norris E. Dodd, FAO Director General, M. Leloup, Chief of the FAO Forestry Department, Professor Colonnetti, Chairman of the National Scientific Council, Professor Patrone, Dean of the Faculty of Agriculture and Forestry of the University of Florence, and Mr. Branzi, President of the National Agency for Pulp and Paper (Congresso in Italia 1953, p. 243).

The agenda included 3 sessions, 122 reports and one excursion – the minimum in the history of the Union. The key objectives of the Union were (IUFRO 1953, p. xii):

- Establishment of close personal relations between forest research workers of all countries, especially between specialists, working in the same fields of activity (Research Sections).
- Informal exchange of ideas and experiences, in general in the whole field of forest and timber research, and in particular within the individual Research Sections (results, research planning and organization, methods and equipment).
- Standardization of concepts and methods, so far as appears desirable.
- Critical analysis of the findings of research work done thus far, and promotion of further research on an international scale.
- Collaboration with international organizations, such as the Food and Agriculture Organization of the United Nations (FAO), with a view to supplying scientific advice and guidance on particular problems.
- Efforts to secure a worldwide uniform classification of forestry literature.

Scientific program

On Tuesday, September 22, at 9:00 a.m., the registration of the Congress participants began in the FAO Headquarters. All sectional sessions of the Congress were held there.

The first plenary session of the Congress began at 11:00 a.m. at the Agriculture and Forest Experiment Centre of the National Agency for Pulp and Paper. The Congress was welcomed by several distinguished persons, including Grand Officer Renato Branzi, President of the Ente

Nazionale per la Cellulosa e per la Carta[126]; H.E. Luigi Gui, Under-Secretary of State for Agriculture of Italy; Marcel Leloup, Representative of the FAO Director General; Hans Burger, IUFRO President (IUFRO 1953).

H. Burger welcomed the audience, thanked the hosts and said, in particular: "King George V of England said once, when opening an exhibition: 'Forestry needs more foresight than any other industry'. Planning for extraordinary long periods, as it is needed in forestry, must be based on sure scientific knowledge. Such planning should, by no means, depend on personal tastes, or on politics or on a particular philosophy of life: it should depend on truly scientific bases. As early as in the 16th century, *Francis Bacon* recommended the scientific experiment as the only basis for knowledge and as the only means of fathoming truth. But the science of forestry only acquired independence in the second half of the 18th century, and not until a good part of the 19th century had passed, did forestry research in the modern sense exist. The first forest research institutes were founded in Germany in the 1870s. Other countries followed. By 1890, an International Union of Forest Research Organizations could be founded. This Union, after two re-organizations in 1929 and 1948, is now more than 60 years old and comprises 96 members from 40 countries" (IUFRO 1953, p. 39).

He further mentioned that fundamental forest information was collected and forestry research was conducted not only by research institutions, but also by the Forestry Universities, and named the Italian forestry universities and other IUFRO member organizations. Then he closed the formal opening session of the Congress. The first meeting of the International Council began at 06:00 p.m. in the premises of the National Research Council.

On September 23-25, 1953, nine Research Sections held their meetings. To save time and increase the efficiency of discussions, a new format for the Congress was tested. The rules had been published in the IUFRO Annual Report for 1951. In particular, they included the following requirement: "No reports will be read at the 1953 Congress. All reports will be duplicated or printed before the opening of the Congress and distributed to the persons who are to attend the Congress, so each will have an opportunity to prepare his discussion on these reports. At the Congress itself, discussion will be confined to the main topics and to the printed reports thereon. These discussions will be introduced and presided over by the Section Leaders or by persons designated by them" (IUFRO 1953, p. xxii).

At the second plenary session of the Congress held on September 25, 1953, the leaders of research sections informed about the results of the discussions. These findings of each section were approved, and in the decision, it was noted that the Permanent Committee, together with the leaders of the sections needed to learn how to implement the findings and recommendations of the sections.

An overview of the sessions and proposals from the research sections are presented below.

Section 11 *General forest influence* (Leader: Professor H.G. Champion, Great Britain) published 10 reports, including the report of the section's leader on forest influences. Others were devoted to the microclimate observations in the secondary forests (Ph. Gerard) and in the dense equatorial forest (E. Madoux); balance of evaporation and transpiration, and their influence on rainfall in the equatorial Congo (E.A. Bernard); the importance of water resources (C. Marshall)[127]; necessity and possibilities to fight against aridity in Asia (F. Heske); the influence of the density of forest shelterbelts on wind speed (W. Nageli); some aspects of shelterbelts in cultivated land (R.J. van der Linde); shelterbelt experiments in Denmark (B. Soegaard); forest and range influence in the USA (H.G. Wilm).

Main conclusions and decisions: 1) *Forest belts and their effects:* to conduct more field research and enhance cooperation; 2) *Effect of forest cover on water economy:* to increase the

[126] National Agency for Pulp and Paper.
[127] The paper had a prophetic title: "Water, the Limiting Resource".

number of centres, involved in addressing the issue with particular attention in studies to define the optimum stocking and shape of stands; 3) *Role of the forest in the fight against drought*: "The great concern expressed in many parts of the world indicate clearly that the study of the beneficial effects of the forest in countries with a negative water balance constitutes one of the most urgent forest problems" (IUFRO 1953, p. 40). Thus, afforestation was essential; lack of statistical data on precipitation and evaporation was a common problem; closer cooperation with FAO was needed; 4) *The special case of the moist tropical forests:* benefits of tropical forests were underlined; the need to increase forest research, in particular: "Investigators should pay particular attention to the changes, occurring due to the replacement of the original forest vegetation by agricultural crops" (ibid., p .41); close cooperation with the FAO was deemed desirable.

Section 21 *Research on site factors* (Leader: Professor A. de Philippis, Italy). There were 12 reports of different nature, covering, in particular, the influence of *Abies alba* and *Pseudotsuga Douglasii* on the properties of the forest soil (A. Pavari et al.); impact of different tree species plantations on the soil modifications after afforestation (Ph. Duchaufour, J.M. Brown); tree species and secondary evolution of soils (A. Galoux); structural stability of forest soils in relation to forest plants (A. Malori and S. Sekkoni/A. Malquori and S. Cecconi); site mapping, classification, description, principles and application (H. Etter, F. Hartman); climatological data in forest research (M. Jacamon); types of beech forests (E. Magini); Eucalypt chlorosis (R. Karschon), as well as two reports by C.P. van Goor on the antagonism between nitrogen and phosphorus in Japanese larch, and fertility losses of the sandy brown forest soils.

Main conclusions and decisions: 1) *Identification of climate-specific vegetation ranges* - the use of phyto-climatic classifications and estimated indexes, such as the xerothermic index, proposed by Gaussen; joint work with the FAO to produce phyto-climatic maps, by region and continent; closer cooperation with the World Meteorological Organization (WMO); 2) *Soil characteristics and natural vegetation as a guide to reforestation* – a basis of guidelines for further research; 3) *Site changes, especially soil changes, due to plantation of non-indigenous species* – change and degradation of soils under monoculture of exotic species; "mixed stands, with or without indigenous species, were to be recommended in finding a solution of the best forest composition for each particular case. Not only the chemical aspects but also the biological aspects of the effect of stands on the site conditions should be investigated" (IUFRO 1953, p. 41-42); 4) *Principles, recognized by different phytosociological and typological schools and their application to silviculture* – Rules to describe the site and vegetation had been provided by the Union in 1936, but were not widely followed in practice. At the Congress, the Section Leader proposed to establish a small working group for further research in this area.

Section 22 *Study of forest plants* (Leader: Professor C. Syrach-Larsen, Denmark) reviewed 17 reports, related to the provenance testing and forest tree breeding (Dr. C. Sirach-Larsen); provenance, biological characteristics and use of certain wood species, such as larch (M.V. Edwards, F. Fisher, B. Veen), spruce in France (P. Bouvarel), spruce with columnar crown (T. Schmuker); polymorphism of spruce in eastern Cadore (L. Susmel), pine species in Guatemala (F. Schwerdtfeger), in Lake City, Florida (F. Mergen), as well as hybrid *Pinus strobus X excelsa* (H. Meyer), *Eucalyptus* in Morocco (A. Métro), in Katanga (Belgian Congo) and in Belgium (A. Galoux); other experiments with *Eucalyptus* (W. Schmidt); poplar (J. Grehn, H. Marquardt); on the test areas of the International Provenance Tests (B. Ween), X-ray photography and sensitivity in forest tree species (M. Simak and A. Gustafson), etc.

Main conclusions and decisions: 1) *Provenance tests* – to acknowledge research of the FAO, the University of Wageningen and Dr. Veen as well as Dr. Veen's report on the International

Provenance Tests; the need to establish a working group of interested scientists for joint research in provenance was expressed; 2) *Procurement and exchange of seed* – although the discussion mainly concerned the seeds of Eucalyptus, it was deemed reasonable to have broader cooperation for other tree species exchange, especially from subtropical coniferous forests and Douglas fir; thanks were expressed to Dr. Guru (Israel) for his offer of using the existing seed repository for the needs of the Union; 3) *Future work* – to improve the efficiency of collaborative research and maintain and regularly update the list of scientists, collaborating in the Section.

Section 23 *Silviculture* (Leader: Professor H. Leibundgut, Switzerland) reviewed 13 reports were presented, 10 of which covered: thinning operations in Europe, North Africa (Morocco) and Asia (India), as well as specific aspects, including theory and practice of regeneration, thinning and quality of young stands (P. Ayral, H. Bauer, J.H. Becking, F.S. Hummel, Y. Ilvessalo, V.S. Krishnaswamy, H. Leibundgut, J. Marion, A. Olberg, J. van Soest), statistical methods in forest research (J.N.R. Jeffers), need for young tree analysis during research (J.N. von Köstler, M. van Miegroet).

Main conclusions and decisions: 1) *Research on treatment of stands* – "(a) The aim of thinning experiments cannot be laid down aphoristically for international purposes; local circumstances and economic conditions will determine their purpose. However the ultimate objective of any silvicultural treatment must be clearly defined before any experiments are undertaken; (b) So that the results of investigations may be comparable, the experimental methods employed should be standardised for various purposes in view; (c) The nature of the problems involved in research into stand treatments necessitates adaptation of experimental techniques. Due consideration must be given to silvicultural and biological aspects; (d) Special classifications of tree types must be established for uneven-aged stands, irregular or comprising several stories; (e) It is desirable that there be more uniformity in the classifications and calculations, characterizing the method and intensity of treatment" (IUFRO 1953, p. 43); 2) The Congress decided to establish a working group to address the raised issues, recognized the need to invite, as necessary, the Leaders of other Sections, the Permanent Committee members, as well as experts in the field of forest protection to join this working group.

Section 24 *Forest protection* (Leader: Professor H. van Vloten, Netherlands) collected 17 reports, which were mostly related to the biology of fungi (H.A. Henriksen); bark beetles (V. Butovitsch, V. Göhrn *et al.*, F. Schwerdtfeger, and other authors); pest control with biological (H. Klomp, research on *Trichogramma evanescens*) and chemical (F. Shvertfeger) methods, including research to address different issues in pine plantations (pine rust/*Melampsora pinitorqua*, E. Rennerfelt), larch (resistance against *Taeniothrips laricivorus*, J.P. Vite), spruce (root-rot and butt-rot of Sitka spruce, by H. Francke-Grossman, *Ips typographus* infestation, F. Schwerdtfeger), Eucalyptus (control of biotic agents, attacking felled *Eucalyptus rostrata*, S. Neumark), chestnut (active resistance to *Endothia parasitica*, A. Biraghi), poplar (reaction to the disease, T.R. Peace). In addition, other reports covered general aspects such as development of forest entomological research (A.D. Voûte) and biological suppression of forest pests (E. Merker). The results of the discussions, led by H. van Vloten, are summarized below:

Main conclusions and decisions: 1) *Resistance Research* – "(a) To facilitate research on resistance, fundamental studies on host-parasite relations are necessary; (b) Resistance research in both pathological and entomological cases is considered possible but must be developed so as to permit international exchange of results… Exchange of all data, even preliminary results, should be made possible in the framework of the Section; (c) Closer cooperation between breeders, pathologists, and entomologists is urgently needed. It is advisable to provide such assistance to breeding institutes which can afford it." 2) "*Site factors, silvicultural means* – Pathological and

entomological research must also address silvicultural possibilities, including site factors, mainly ecological aspects" (IUFRO 1953, p.43); 3) *Study of populations* – to set up a working group of members, interested in population studies, including studies of soil biocenosis.

Section 25 *Study of growth and yield and forest management* (Leader: Professor Y. Ilvessalo, Finland) collected the largest number of reports – 28. More than half (15) of them were devoted to growth and yield (Y. Ilvessalo), especially in young coniferous stands (F.C. Hummel and I. Brett), "Crown quality class" in inventory of growing stock and increment (F. von Loesch), natural mortality in forests (E. Badoux) and especially in Finland (Y. Ilvessalo) and New Zealand (G. Duff), various growth and yield tables in Germany (J. Weck), Spain (F.I. Echeverria), Finland (Y. Ilvessalo), Canada (J.D.B. Harrison), USA (P.Y. Burns) and Indonesia (J.H.A. Ferguson), research methods in the Philippines (F.O. Chinte), measuring increment in Sweden (B. Eklund).

The research experience in this field was discussed as applied to Germany (J. Weck), Switzerland (H. Etter), Belgium (P. Reginster), Denmark (H.F. Henriksen), the Netherlands (M. Huet), Malaysia (G.G.K. Setten), India (S.R. Ranganathan), British Columbia (J.H.G. Smith) as well as the theoretical basis for determining yield (M. Naslund, J. van Soest), and the computation of increment (S. Petrini, L. Schaeffer). Then, the Leader of the Section, Professor Ilvessalo summed up the discussions.

Main conclusions and decisions: 1) *Rapid assessment of growth* – to establish relative advantages, accuracy and cost of different methods; 2) *Mortality from natural causes* – there were too little intensive studies; 3) *Relationship between the present growth and yield and that to be attained through regular management* – a vast amount of materials on the permanent sample plots accumulated, yield tables for the normal and modal stands compiled; 4) *New directions of research proposed*: (a) Purposes and methods of forest yield investigation, and (b) Uniformity in yield studies. In addition, a proposal made to establish a group to prepare a feasibility study and make recommendations on standardization of symbols and measurement systems, used in forest inventory (biometrics).

Section 31 *Forestry economics* (Leader: Professor A. Oudin, France; Section Leader designate: J. Speer, Germany) reviewed six reports on forestry economics (J.J. MacGregor); valuation of standing timber in the USA (J.H.G. Smith); dynamics of the calculation of rotation (H. Hermansen); assessment of forest exploitation in Germany (J. Speer and R. Merkle); scientific principles as applied to Scandinavian farm forests (M.E.A. Hagfors); relationships between agriculture and forestry in farms (K. Abetz).

Main conclusions and decisions: (a) valuation of harvested and standing timber as well as an assessment of individual stands and forest land were required for the tax valuation for forest owners if stands were not normal; (b) the need was recognized to further explore small woodlots in private forests in Europe and elsewhere; (c) valuation of plantations should include specific risks of fire, pests and diseases; (d) continue the discussion at the next Congress.

Section 32 *Operational efficiency* (Leader: Professor U. Sundberg, Sweden) collected 14 reports. Key presentations highlighted the importance of definitions, tools, methods and limitations of studying logging (H.H. Hilf; H.H. Hilf and G. Kaminsky); research to increase logging efficiency (A. Koroleff); studies to assess physical demands during felling on steep slopes (H. Glaser); physiological research in the field of lumberjacks' working competitions (M.J. Karvonen); time studies in logging operations (P. Aro, O. Makkonen); fundamentals, definitions and essential time groups in the Swedish Job Study Technique, concerning forestry (three reports by L. Mattsson Morn), teamwork study (K. Putkisto), results of cutting studies in Norwegian spruce forests (I. Samset); and experiments with pruning dead branches (J.W.L. Zehetmayer).

Main conclusions and decisions: 1) *Scope of work for the Section* – The extent of forest

operations should be determined based on the whole set of logging operations – in other words, it required careful research in technology, use of tools and machines, proper labour organization, and fair payment for each operation. Although logging issues were mostly discussed, other issues should be addressed too; those included timber bucking and transport, composition of forestry work, forest planting, forest management; scientific organization of labour should be integrated into research agenda in all research institutes and become an integral part of training for forest specialists;

2) *Collaboration with other international organizations* – the positive role of the FAO European Forestry Commission which established the Pilot Committee on Logging Techniques and Training of Forest Workers, and close contacts of this Pilot Committee with IUFRO Section 32. The Leader of this Section was a representative of IUFRO in the Committee. If needed, it was desirable to establish contacts with Physiology Section of the International Union of Biological Sciences (IUBC)[128], the World Health Organization (WHO)[129], the International Labour Organization (ILO)[130] and the International Organization for Standardization (ISO)[131];

3) *Research in general* – (a) "The members of Section 32 highly appreciated the paper, presented by Mr. Koroleff which dealt both with revolutionary and evolutionary research and emphasized the importance of the former"; (b) "Because of the increasing importance of tropical forests, forest research in these regions will be very valuable in the future" (IUFRO 1953, p. 46);

4) *Work studies* – "Work studies are scientific methods to be applied for scientific or practical purposes, in research as well as in forest practice. Until now, work studies have been developed in different parts of the world and, for that reason, have given results which are difficult to compare" (IUFRO 1953, p. 46). Therefore, the Congress recommended: "(a) the preparation of a terminology (glossary) in various languages and a systematic classification of this field, giving recognition to certain concepts, (b) an exact description and classification of .the methods in use, with the objective to produce comparable results, (c) standardization of the methods as far as this may be possible without compulsion or reduction of the methods to a few basic types" (IUFRO 1953, p. 46), (d) the Section should establish a group to conduct a study to assess the degree of productivity of forest workers (performance rating);

5) *Physiological aspects* – health of people, working in the forest was more important than welfare of forests and their products; thus, (a) comprehensive assessments of workers' energy consumption and impact of work on the health of workers (including physiological, psychological, and social aspects of occupational health) were needed; (b) it was recommended to conduct such research everywhere, including countries where the work was undertaken by logging companies; (c) regardless of current employment conditions, a forester had to pay greater attention to these issues, keeping in mind social responsibility and economy.

Section 41: *Mechanical conversion, more precisely*, "Physical and technical characteristics and use of the forest products" (Leader: Professor J. Campredon, France). Several reports of this Section were focused on the correlation of wood quality and breadth of the annual tree rings (H. Mayer-Wegelin, J. Wenet); the use of sawdust in the production of synthetic textiles and plastics (F.C. Palazzo); physical and technical importance of heartwood substances (F. Kollman); specific

[128] *IUBS* is a non-governmental, non-profit organization, established in 1919.
[129] *WHO* is the specialized agency of the United Nations (UN) that is concerned with international public health, established in 1948.
[130] *ILO* is the United Nations agency, dealing with labour issues, particularly international labour standards, social protection, and work opportunities for all, established in 1919.
[131] *ISO* is the international standard-setting body, composed of representatives from various national standards organizations, which promotes worldwide proprietary, industrial and commercial standards, established in 1947.

weight of *Eucalyptus camaldulensis* wood in relation to some factors concerning individual trees and the surroundings (L. Susmel).

Main conclusions and decisions: 1) It was found desirable to exchange experience and reports between IUFRO and FAO; 2) Special attention should be paid to the following two issues: (a) relationship between the chemical structure and composition of wood and its physical and mechanical properties: (b) qualities of the wood of different types of eucalyptus and poplar, cultivated in Europe and Latin America; 3) biological and chemical aspects should be in the competence of the Section, thus, it should re-named into *Study of the biology, chemistry and physics of forest products*. "Work would be directed primarily to biological problems while the FAO's Technical Panel on Wood Chemistry was concerned about industrial application of research outputs" (IUFRO 1953, p. 47).

It should be noted that research on forest products was not a priority for the Union for over 50 years. The impetus to the development in this area came from the World Wars, especially the WW II. Wood was of great importance for construction of airplanes, ship, rail cars, and packaging for transportation of goods, construction and production of various products. Establishment of the UN FAO gave an opportunity not only to coordinate efforts in the forest sector, related to forest exploitation and consumption of wood in its various forms, but also identified the need for a deeper study of its properties and expansion of applications. With its growth and development, IUFRO recognized the need to integrate effective use of forest products, along with other aspects of forestry and forest management, into research as its basic element to meet growing needs of society. Thus, forest products research was introduced through the establishment of IUFRO Section 41 which held its first meeting at this Congress[132] (Youngs and Youngquist 1999).

After the Research Sections made their reports, the President gave the floor to Professor E. Saari, Chairman of the Joint FAO/IUFRO Committee on Bibliography. Professor Saari reminded of the background of the issue, dating back to 1903 when the International Association of Forest Research Institutes had put this question on agenda. Then, he underlined: "The most important name in the history of forest bibliography is that of Dr. Philip Flury. This Swiss forester was a member of the Bibliographical Committee from the beginning, and it was he who did the greater part of the creative work. After long and difficult preparation, the Committee presented to IUFRO a complete system of the classification of forestry literature, adopted in Congress, in 1933. In its printed form, it was titled Forest *Bibliography*, but was widely known as the Flury System. It was assigned the decimal signature 634.9F to distinguish it from 634.9 Silviculture, Forestry in the Universal Decimal Classification (UDC) which differs in details of its subdivision" (IUFRO 1953, p. 48).

Professor Saari mentioned the leaders of the Bibliographical Commission in different years who had guided the work of the Committee till the time when the Flury System was completed: Professors A. Bühler (Tuebingen, Germany), A. Opperman (Copenhagen, Denmark) and R.S. Troup (Oxford, UK). The work on forest bibliography was interrupted by World War Two, and resumed in 1948 when the first post-war meeting in Zurich was chaired by Professor H. Burger. At that meeting, Dr. F.C. Ford-Robertson, Director of the Commonwealth Forestry Bureau at Oxford, "presented a completely revised system of classification for forest literature which had been prepared by his Bureau in consultation with" other UK agencies, working on the testing and improvement of the system during almost 10 years of collaboration. Thus, the Congress received the final text of the description in English of the new classification system, called the Oxford System of Decimal Classification.

However, at the last Congress, no action was taken, as the Union was closely engaged in the

[132] The research program was substantially expanded at the 13th IUFRO Congress in Vienna in 1961.

negotiations with the FAO on further relations between the two organizations. When the Joint FAO/IUFRO Committee on Bibliography was set up, it held a series of meetings during 1949-1953 (Helsinki, 1949; Oxford and The Hague, 1950; Wageningen, 1951; Oxford, 1953; and now in Rome[133]), as well as consultations with the International Federation for Documentation (Fédération Internationale de Documentation, FID)[134] in Hague in 1950 and forestry experts in the German Federal Republic at the invitation of Professor K. Mantel in 1953. The early consultations of the Committee with the FID were meant to explore possibilities for incorporating the new system of forestry bibliography into the Universal Decimal Classification (UDC), but the process was not completed. In the 1940s, the rapid development of forest science necessitated reviewing the Oxford System of Decimal Classification for Forestry, so the decision to move to the UDC was also presented to the Congress and adopted unanimously. Two months later, the FAO Conference also adopted the system which was subsequently adopted by most forest libraries, institutes and documentation centres in the world.

Main conclusions and decisions: *1) Classification of forestry literature* – The Congress urged (a) all member organizations to adopt the Oxford System of Decimal Classification for Forestry; (b) as the original text of the Oxford System was published in English, it was desirable to translate and publish the text at least in French, German and Spanish;

2) *Documentation of forestry literature* – The Congress urged: (a) all countries to establish national centres for forest bibliography with the aim of collecting and classifying forest literature in the country and cooperation with centres at the international level; (b) these centres should undertake regular production of national bibliographies in the form of complete title lists; (c) the publishers of forest journals, periodicals, serials, bulletins, newsletters, etc. should give with each article an adequate summary and translation of the legends of illustrations, tables, graphs, etc. in English, French, German or Spanish if the original text is not in one of these;

3) *Forest terminologies* – The Congress urged: (a) each country or countries of one language group to establish a standing committee on terminology for the exact description of each forestry term, and (b) to publish a forestry terminology with a view to creating multilingual dictionaries;

4) *The furthering of scientific contacts in cognate subjects at a personal level* – The Congress (a) approved the results of the Joint FAO/IUFRO Committee on Bibliography in the form of compiled and distributed lists of scientists for development of informal contacts, and (b) greatly appreciated the FAO's work for the preparation and publication of *Research in Forestry and Forest Products* (FAO, 1953), which included a List of forest research organizations.

On the morning of September 26, 1953, the second session of the International Council began at 9:00 a.m., and at 11:00 a.m., the final plenary session and official closing ceremony of the Congress were held at Palazzo dei Congressi (the Convention Centre), International Agriculture Exhibition.

H. Burger, Chair of the meeting, summarized the deliberations of the Congress and various discussions during the Congress as well as the results of the International Council meetings and its resolutions. On behalf of the FAO, I.T. Haig congratulated the Congress on the success of its work and conveyed the intention to further work with IUFRO for the benefit of international forestry. Professor A. Oudin expressed his gratitude to all who helped to prepare and hold the Congress,

[133] Report of the sixth session of the joint FAO/IUFRO committee on bibliography - Rome, Italy, 18-25 Sep. 1953. - Forestry and Forest Products Div., 1953 FAO 1953 - 11 p., 4 app.

[134] FID (since 1988 – International Federation for Information and Documentation), established in 1895 as the International Institute of Bibliography with the aim to facilitate problem solving of scientific and technical information

particularly to the Italian authorities for their hospitality as well as former President Hans Burger and Technical Advisor Hermann Etter for their work for the Union during five years. J. Macdonald (Great Britain) and J.N. Kostler (Germany) shared the remarks of gratitude. Finally, G. Sacchi, Director General of Forests (Italy) responded on behalf of the Italian Government. The Congress was closed.

After lunch, the participants departed from Rome for the study tour to Palermo (Sicily) with their final destination to Taormine on October 4, 1953.

Organizational matters

IUFRO worked in accordance with its new Statutes, which set the following governance framework:

"The President, together with the Permanent Committee which meets once a year, directs the affairs of the Union. He is assisted by a Technical Adviser, designated by himself, and by the Secretariat of the Food and Agriculture Organization of the United Nations at its Headquarters in Rome, under the agreement, concluded between the Director-General of the FAO and the President of the Union.

The supreme controlling body is the International Council which meets every three to five years on the occasion of the Congress of the Union, and to which each country appoints a representative.

The scientific activities of the Union are carried on mainly through the eleven Research Sections, each of which is directed by a Section Leader. Any research worker who belongs to a member institute or is an associate member may, at his discretion, belong or collaborate with one or several Research Sections" (IUFRO 1953, p. xi-xii).

IUFRO activities included: issuance of guidelines for describing research on permanent sample plots, standardization of the description of experimental plots, development of rules for international forest seed control and for forestry literature classification.

On September 22, 1953, the first meeting of the International Council, chaired by IUFRO President H. Burger, started with a welcome address of Professor Morelli, Secretary General of the Italian National Research Council, hosting the meeting.

The Council approved the agenda, drafted by the Permanent Committee and identified three main issues to discuss: (1) IUFRO Report for the period from January 1949 to 22 September 1953, (2) International Seed Testing, and (3) venue and time of the next Congress.

At the first session, the President of the Union reported on the administrative activities since the last meeting of the Council. In the open discussion, A. Galoux (Belgium) proposed to create a new research section on tropical forestry. The proposal was supported by A. Métro (Morocco) who also identified additional issues, related to afforestation. H. Burger noted that the issues could be addressed without creating a new section, and could be considered within the existing sections, such as Section 23 (Leader H. Leibundgut). Professor A. Pavari (Italy) supported this proposal, noting that afforestation was not only a research area, but also a practical experience that could be addressed by the Joint IUFRO/FAO Committee, as the Mediterranean Sub-Commission of the FAO attached great importance of it. L. Markovic (Yugoslavia) proposed to make this issue a priority for Section 23 unless it was possible to create a new section. This proposal was supported by H. van Vloten (Netherlands). Presiding H. Burger thanked the delegates for their comments, noted that the Section in the IUFRO Statutes was not reflected as a structural unit and suggested that tropical forestry and afforestation should be brought to the attention of the newly elected Permanent Committee, and pointed that it would be desirable to consult with the FAO.

Sections 2-5 of the report covered relations with the FAO, composition of the Permanent Committee and appointment of the Technical Adviser and his duties; they did not require discussions and were adopted as a whole. Dr. I.T. Haig (FAO) reiterated the view that the FAO Secretariat could be of greater assistance for the Union.

The sixth section of the report was about the IUFRO membership, and President H. Burger noted that one of the institutions opted out of IUFRO due to its inability to pay annual fees. He expressed the hope that this institute would revise its decision since fees were not so high, and that, in accordance with the IUFRO Statutes, the institute would remain in the list of members for the next two years. A. Horky (Austria) remarked that the participation of the four Professors from this institution in the Congress reflected their keenness to take part in activities of the Union.

Sections 7-9 of the report (financing of the Union, scientific activity, scientific exchange) were no commented, and the report was adopted with minor amendments.

Under agenda item 2 (international seed testing), Professor H. Burger opened the debate on the report W.H. Guillebaud, Deputy Director, Forestry Commission, UK, who had represented IUFRO at the meeting of the International Seed Testing Association (ISTA) in 1952 in Dublin, Ireland. Mr. J. Macdonald (UK) suggested that G.D. Holmes, Manager of the Forest Tree Seed Testing Station in the UK, should be given an opportunity to clarify some points of the report. G.D. Holms had attended the meeting in Dublin and said that an agreement had been reached on almost all issues, except for the definition of pure seed. It was decided that a "quick method" of seed testing rather than a "strong method" should be used for international exchange of seeds. Another important feature was the inclusion of descriptions of rapid methods of seeds germination for seeds that were dormant or difficult to germinate.

H. van Floten underlined that the Council should approve, publish and disseminate the new rules for seed testing (approved by the last FAO Conference) to provide a framework for seed quality certification. He also supported the recommendation of Mr. Guillebaud that contacts between the ISTA and IUFRO should be continued, and experts in the field testing of forest tree seeds should participate in the next conference of the Association. H. Burger thanked Mr. Holmes for his presentation and ask the Council to approve the report of Mr. Guillebaud.

Under agenda item 3, J. Macdonald (UK) said that he was authorized to convey the offer of his country to host the next, 12th IUFRO Congress. It could enable its participants to see "the rapid expansion of forestry activities since the last war" (IUFRO 1953, p.32). Several delegates supported this proposal and thanked Mr. Macdonald. Then, H. Burger also thanked for the invitation and proposed to hold the 12th Congress in July, 1956.

The Congress introduced a new IUFRO Award: *Honorary membership* – the highest award to acknowledge persons, usually from the top management of the organization, who rendered particularly important and outstanding service to the Union. Before closing the meeting, H. Burger proposed candidates for honorary members, and the Council voted for the election of the former IUFRO Presidents: Professors Philibert Guinier (Paris), Gyula Roth (Hungary) and Eric Lönnroth (Finland) as Honorary Members. These three distinguished persons were included in the list of the first recipients of the award, opening a new page in IUFRO's history – the recognition of the services to the organization.

On Saturday, September 26, 1953, at the Palace of Congresses, the second meeting of the International Council elected President, Vice-Presidents and Members of the Permanent Committee.

Professor Aldo Pavari (1954-1956) from Italy was elected new President, and H. van Vloten (Netherlands) became Vice-President. The Permanent Committee re-elected C.F. Korstian (USA), M. Kreutzinger (Poland), and A. Oudin (France) members, and new members were elected:

J. Macdonald (UK), S.R. Ranganathan (India) and L.A. Tortorelli (Argentina). E. Lönnroth suggested making an amendment to the IUFRO Statutes to permit to elect two more members of the Permanent Committee in order to widen the technical and geographical coverage and the influence of the Committee.

The Section Leaders were also elected. All of them were from European countries: Section 01 – E. Saari (Finland), 11 – H.G. Champion (UK), 21 – A. de Philippis (Italy), 22 – C. Syrach Larsen (Denmark), 23 – H. Leibundgut (Switzerland), 24 – H. van Vloten (Netherlands), 25 – Y. Ilvessalo (Finland), 32 – U. Sundberg (Sweden) and Section 41 – J. Campredon (France). Thus, the changes affected only two Sections: Section 01 (forest terminology) where E. Saari became the Leader, and Section 31 (forest economics) where the J. Speer (Germany) became the Leader instead of the untimely deceased Professor Schaeffer, who was earlier elected to take this position.

The International Council was elected to include 22 members and observers from the FAO (M. Leloup and I.T. Haig).

Resolutions

Resolutions were adopted separately by the International Council, at the plenary sessions of the Congress, and by the Sections.

President H. Burger invited the International Council to consider the following six resolutions which were adopted as a whole (1953, p.31):

> "*Resolution 1.* - The activities of the President and of the Permanent Committee during the period of office 1 January 1942 to 22 September 1953 are approved. *(Adopted).*
>
> "*Resolution 2.* - The present organisation of the Union is to be maintained. (Adopted, after it had been agreed that this did not prejudice the creation of additional research sections or joint bodies with the FAO, should such steps be considered desirable and necessary).
>
> "*Resolution 3.* - The International Council acknowledges with gratitude the very valuable and disinterested work, performed by the Leaders of the Research Sections, and places full confidence in their future activities. *(Adopted).*
>
> "*Resolution 4.* - The accounts of the Union since l January 1949 are approved. (Adopted, with an expression of sincere thanks to H. Etter, Technical Adviser, for his work in this connection).
>
> "*Resolution 5.* - The minimum annual subscription shall remain at 120 Swiss francs for Ordinary Members and 25 Swiss francs for Associate Members. *(Adopted).*
>
> "*Resolution 6.* - All admissions to membership of the Union since 1 January 1949 are approved. (Adopted).
>
> "In December 1948, the Union had 47 members. Since then, membership has risen to 96, and 40 countries were· represented. It has not as yet proved possible for the United States Federal Research Stations to join the Union. E.C. Jahn (U.S.A.) said that he would certainly discuss this particular point further with Mr. Korstian on his return to the United States.
>
> "H. Burger moved the final draft resolution, related to the assistance, rendered to the Union by the FAO. He pointed out that the Union's total income amounted to only CHF 10,000 annually and that without the FAO's help in the form of staff and services, it would not be possible for the Union to continue with its tasks.
>
> "*Resolution 7.* - The International Council extends its most sincere thanks to FAO Director General Norris E. Dodd, to Director of the FAO's Forestry Division Marcel Leloup, and Deputy Director E. Glesinger, for the collaboration with the Union during the past five years in a spirit of loyalty and friendship, and especially for putting secretariat services at the Union's disposal. Furthermore, the International Council very sincerely thanks the members of the FAO secretariat concerned: I.T. Haig, R.G. Fontaine and L.J. Vernell, for their highly appreciated work in the service of the Union. (Adopted)."

Excursions[135]

The study tour to Sicily was started on September 27, 1953 and ended on October 4, 1953. The participants departure from Rome to Palermo and completed the tour at Taormine on October 4, 1953. The tour was rather long, even by modern standards, and the participants drove nearly one thousand km along the western coast of Italy and in Sicily.

On the day of arrival to Palermo, the group visited the city and went to the newly opened experimental centre of pulp, paper and textile fibres, set up by the Region of Sicily, where they listened to an interesting lecture of the Director, Professor F.C. Palazzo, and visited several equipped laboratories.

The next day was spent visiting extensive reforestation areas (about 3,000 ha) in Rigano, where the delegates commended the success of forest regeneration in difficult economic and environmental conditions. After lunch, the group visited the Monreale Cathedral and Botanical Garden of Palermo. In the evening, a superb dinner was offered at the Grand Hotel Villa Igea from the regional government, represented by Mr. Germanà, Councillor for Agriculture and Forests.

On September 29, 1953, they took a long trip to Monte Pellegrino to get acquainted with the management of 40-years-old forest plantations, which consisted mainly of Aleppo pine and stone pine, holm oak, eucalyptus, acacia and other trees. During the Congress, management practices for these plantations had been highlighted, and now, the delegates could see them with their own eyes. Professors Pavari and de Philippis illustrated the results of the research to find the best technique for soil preparation. In the afternoon, the forest restoration in Sicily was illustrated in an effective presentation of Mr. Germanà in the town hall of Palermo which was followed with an elegant reception, hosted by the Mayor of the City.

On the next day, the participants arrived from Palermo in Taormina where they visited the forest nursery of Canalicchio and surrounding eucalyptus (*Eucalyptus rostrata* and *E.globulus*) forests that amazed most visitors: the average height of 20-years-old tree plantings reached 21 and 23 m, respectively, the average diameter was 30.5 and 37 cm. They visited a 3-year plantation of *Eucalyptus globulus*. They had a hearty lunch with Mr. Milazzo, Councillor for Public Works, in Piazza Armerina. During the tour, the participants could see the reclamation of gullies of Caltagirone and the forest nursery in Plaia of Catania.

In the morning of October 1, 1953, the delegates visited reforestation sites in some coastal areas of Mascali, and on the next day, they visited the reforestation forestry department of Peloritani. In Messina, the participants could see green slopes, reforested with pine, in stark contrast to those not yet reforested; experimental plantings of *Eucalyptus* (11 species), radiata pine (*P. insignis*) and other species; and the enchanting landscape. Then, they had a lovely lunch, offered by the Forestry Corps of Sicily (*Corpo forestale della Sicilia*), in Messina.

One of the most interesting parts of the trip was the visit to the volcano Etna on October 3, 1953. Starting from Taormina and going through Linguaglossa, the group reached the Ragabo forest, one of the few groups of vegetation of Corsican pine on the Etna slopes. They were also very impressed with the visit to the pine forest: the smoking crater against the background of the exceptionally clear sky during the morning, chestnut trees, vineyards, hazelnut bushes, alternating with dark lava flows. There were numerous endemic plants, e.g., *Genista aetnensis*, trying hard to compete for land on the slopes. All these made a great impression on the Congress participants, who were a bit sad about the inability to continue the climb to the Rifugio Sapienza (1,900 m) to reach the summit of the mountain.

[135] Based on the article (Congresso in Italia 1953).

On the last day, October 4, the closing session was held when the tour participants were given more information and clarifications on the sites that they had visited.

The thoroughness and carefulness of the organization, and the warmth of the welcome from the Sicilian authorities and forestry agencies were strongly emphasized by many delegates who took the floor during the official ceremonies and closing session (Congresso in Italia 1953).

Soviet/Russian participation

Foresters from the USSR probably intended to participate in this Congress, but the in-country events of spring and autumn of 1953 did not allow them to do so. However, in Rome, there were emigrants or descendants from the Russian Empire.

For instance: Professor Viktor von Butovitsch, Head, Department of Zoology, Swedish Research Institute of Forestry, participated and presented his paper at this Congress (Naslund 1953; IUFRO 1953, p. 645-649). He had also been a delegate to the IUFRO Congress of 1929.

In the Congress proceedings, the name of Alexander Koroleff (1889-1976), Director, Woodlands Research Division, Pulp and Paper Research Institute of Canada, Montreal, was mentioned, but it was not in the list of participants. He was probably invited to the Congress exclusively; or at the time, he may have been an associate member of the Union. But, it was noted in the final documents of the Congress that the members of Section 32 highly appreciated his report, called: *Research to increase logging efficiency* (IUFRO 1953, pp. 984-990) which addressed revolutionary and evolutionary research and emphasized the importance of the former... Problems of bark removal and improved organization of logging operations, such as through hauling long stems or whole trees from the felling site before conversion, should be taken as examples of revolutionary research in Europe (ibid., p. 46).

Alexander Mikhailovich Korolev (Koroleff) was born in 1889 in the Russian Empire. He graduated from the Imperial Forest Academy in St. Petersburg. In 1917, he was sent by the Government of the Russian Empire to study logging mechanization in North America, but due to the political turmoil, he did not come back to Russia and undertook studies at the Yale University and University of Washington (Unasylva 1953). In 1921, A.M. Koroleff obtained a Master Degree in Forestry from the University of Washington. In July 1926, he resigned from his position of Instructor in Forestry at the University of Minnesota[136] and moved to Portland, Oregon. In 1927, A.M. Koroleff "left the Portland district office of the United States Forest Service to become secretary of the Woodlands Section of the Canadian Pulp and Paper Association" (Forest Worker 1927, p.20).

During those years, A.M. Koroleff made a great contribution to the development of the Canadian forestry and forest sector as a whole. He published over 100 bulletins, technical and scientific papers, books, textbooks and manuals. As the Secretary-Manager of the Woodlands Section of the Canadian Pulp and Paper Association (CPPA WS) he could address a variety of general forestry and forest management issues which were in the sphere of his interest, ranging from forest regeneration to logging technology and techniques. However, his greatest contribution was related to "pulpwood cutting, skidding, hauling, driving, road construction and forest management, which set a standard, worldwide, for work in this field" (Silverside 1976, p.215). In 1945, as the Director of Woodlands Research at the Pulp and Paper Research Institute in Montreal and an expert,

[136] University of Minnesota, BOARD OF REGENTS, AGRICULTURAL COMMITTEE, MINUTES, July 28, 1926, Year 1926-1927, No. 29. "A meeting of the Agricultural Committee was held in the Regents' room on Wednesday, July 28, 1926, at nine o'clock. … Voted to accept the following resignations… A. M. Koroleff, Instructor in Forestry, effective July 10, 1926." (University of Minnesota, page 243).

representting Canada, A.M. Koroleff participated in the First Session of the United Nations Food and Agriculture Organization where the FAO was formally established on October 16,1945 (FAO 1945).

Being of the Russian origin, A.M. Koroleff published an extensive review of timber industry in the USSR (Koroleff 1952). This overview considered over 100 papers and other publications in Russian since 1947 and showed the evolution of logging machinery and techniques used in the USSR. The book demonstrated how the USSR timber production based on manual felling and horse skidding and hauling had been evolving into a highly mechanized timber industry. At that time, this book was a high-value knowledge source for research, enabling researchers to trace progress and trends in the USSR's timber industry. It was very difficult to acquire such information due to the language barrier. Later, in 1960-1966, he published a number of papers about the USSR/Russia forest logging mechanization, use of chemicals in forestry, full-tree logging, and waste disposal.

Owing to his multifaceted outstanding achievements and deep knowledge in the field of forest mechanization, he was commissioned to lead the preparation of the forest logging chapter in the Forestry Handbook published by the Society of American Foresters (Fridley, Miles and Greulich 1992)[137]. A.M. Koroleff's research and practical findings and results were widely cited in research papers (Sundberg 1988; Hull 1994; Heinimann 2007).

After his retirement, "Alex lost touch with the Foresters in Eastern Canada to a large degree. Perhaps it was an acceptance by him that his work, to a degree, was done. However, he remained very alert mentally and developed a lively interest in ethology, man's relationship with nature. The breadth and depth of his interests and the acuteness of his mind stayed with him to the end… Former Manager, Woodlands Section, Canadian Pulp and Paper Association, and Director, Woodlands Research, Pulp and Paper Research Institute of Canada, died on May 25, 1976 after a short illness, at the age of 87 years" (Silverside 1976, p. 215).

[137] "In 1955 the Society of American Foresters published its first handbook, the *Forestry Handbook*. A committee led by A.M. Koroleff of the Pulp and Paper Research Institute of Canada prepared the chapter on logging. The chapters on road engineering and surveying were prepared by a committee chaired by Anthony P. Dean of the U.S. Forest Service. A total of 167 pages of this handbook are dedicated to forest engineering, which is indicative of the need for published materials at the time. Although not explicitly an engineering handbook, the Forestry Handbook is a common reference book in the libraries of most forest engineers" (Fridley, Miles and Greulich 1992, p.134).

Chapter 17
Congress XII - July 7-14, 1956, Oxford, UK

The bulk of the information for this Chapter was drawn from the Proceedings of the 12th IUFRO Congress, published in London by the UK Forestry Commission in 1958 (IUFRO 1956a-e).

Overview

The 12th Congress brought together 242 representatives from 42 countries and areas such as Kashmir (hitherto disputed territory between India and Pakistan), Northern Borneo and Sarawak (now states of Malaysia), British protectorates – British Eastern Africa (now Kenya), Nyasland (now Malawi), Northern Rhodesia (now Zambia), and a British colony – the Gold Coast (now Ghana) [138]. The most numerous delegation was from the Congress's host country – the UK – 72 people (including protectorates and colonies – 78 people), and much less from Germany (21), Sweden (16), France and the Netherlands (12), Finland (10), Yugoslavia (9), Denmark, Italy and the United States (8), Switzerland (7), ..., Turkey (4), ..., Israel, Japan, Korea, the Soviet Union, and others – one delegate, and FAO – 5 people. The agenda included 4 sessions, 160 papers and 7 excursions.

Scientific program

The Congress opened on July 7, 1956, by welcoming and keynote speech of D. Heathcoat-Amori, Minister of Agriculture, Fisheries and Food of the United Kingdom: "I am delighted to be with you today. This is the first occasion on which the Union has met in this country and it is a great honour for me to welcome, on behalf of Her Majesty's Government, all of you who have come from abroad. But let me say right away that my pleasure is mixed with an acute sense of trepidation at finding myself the only layman among such a distinguished gathering of forestry scientists and experts from all over the world. The atmosphere is heavily charged with an enormous potential of forestry science, knowledge and expertise. I fear an unbridgeable gap lies between my ignorance and your knowledge, even though I am a countryman and have lived in the country all my life. Clearly the one subject I must not talk about today is forestry.

But quite apart from all that I always feel rather awed when I am dealing with forestry matters. They seem to be so very long term. You measure the life-span of your trees and forests in decades, if not centuries. You will know the old Spanish proverb:

The vine is mine,
The olive tree is my father's
And the oak tree is my ancestors'

How very true this is. And it is all rather disconcerting to a Minister of Agriculture (and I dare say this applies to some of my colleagues abroad) who measures his Ministerial life in terms of months, or if he is in a very rash and optimistic mood, a year or two" (IUFRO 1956a, p.11).

He further stressed that IUFRO stepped over sixty, the "Diamond" anniversary, and was approaching its seventieth, saying: "There have been immense changes in the world since 1890 when it was founded, but despite them all the Union has gone steadily on from strength to strength, playing

[138] In the official IUFRO sources, only 36 countries were listed for 1956 (IUFRO 1992), i.e., these six mentioned territories and colonies, the delegates of which were associated with the delegation of Great Britain and not counted. Meanwhile, among the participants, Dr. A.L.Griffith was listed under the title of British Eastern Africa, and Dr. I.A.S. Gibson – from colonial Kenya (IUFRO 1956a, p. 118, 121).

an increasingly important part in helping to widen the world's knowledge of forestry. From its relatively modest beginnings it has grown in size and influence and today has as its members 139 organizations from 48 different countries. I was very pleased to learn that recent new members include the Research Stations of the Forest Service of the U.S.A. and the Academy of Sciences of the Soviet Union. These notable new recruits are certain to add materially to the Union's strength and will enable its good work to be spread even more widely" (ibid., p.11).

The Minister emphasized the attention, given in the UK to the forestry sector, including the universities' forest faculty: "I do not think you will mind if at this point I mention Professor Champion… His work and that of the Institute is familiar to everyone concerned with forestry. And it is largely due to him that this Congress is being held in Oxford and that the excellent facilities of the Imperial Forestry Institute are at the Union's disposal… It is I think particularly fitting that in the middle of this Congress, for which he has done so much, Professor Champion will leave you for Buckingham Palace where he will be knighted by Her Majesty the Queen. I am sure that you will all wish to join me in offering him and Oxford our warmest congratulations" (IUFRO 1956a, p.12). It is also noteworthy that, according to the Minister's calculations, the IUFRO Congress should be held in the UK in 2022.

Then, the floor was given to IUFRO President Professor A. Pavari, Vice President Dr. H. van Vloten, Representative of the Permanent Committee Dr. C.F. Korstian, and Representative of the FAO Director General M. Leloup.

In particular, President A. Pavari thanked the Congress Organizing Committee and reported about the growing number of the Union's members. By this Congress, the Union had 139 ordinary and 6 associate members from 48 countries[139] – 21 European countries and 27 countries in other continents. He also stressed that the satisfactory situation was satisfactory in terms of considerable progress and effectiveness of work owing to good relations with the FAO and its Forestry Division. Also, the structural division of the Union into sections proved its vitality through performing of sound research, and the Section Leaders displayed remarkable proactivity (IUFRO 1956a, p.15).

Then, the Section Leaders reported about the activities and results, achieved in respective Research Sections.

Section 01 *Forest Bibliography* (Leader E. Saari (Finland, Joint FAO/IUFRO Committee), members: T. François and G.G. Watterson (both from the FAO), K. Abetz (Germany), F.C. Ford-Robertson (UK), F. Martinez Mata (Spain), and R. Rol (France)). The Section considered several important issues:

Oxford System of Decimal Classification for Forestry. The task, set in 1948-1949 by the FAO and IUFRO, was to prepare a new classification system for forestry, which had to outrun the structure and capacity of the Flury Classification, adopted by IUFRO in 1933. It was for the first time that an original English version of new classification was presented and unanimously approved by the Congress in Rome (1953). The Congress urged all members to adopt the system, officially titled the *Oxford System of Decimal Classification for Forestry* (ODC), and expressed the wish to make and publish the translated versions in French, German and Spanish[140]. The system was also praised at the FAO Conference during its Seventh Session in Rome in 1953, and in December 1954, this work was recognized and approved at the IV World Forestry Congress in Dehradun, India, to be "generally adopted for the bibliographical work of forestry" (IUFRO 1953a, p. 18).

The full text of the ODC in English was published in 1954 in England on behalf of IUFRO

[139] In 1956, the United Nations Organization included 80 countries, so, the IUFRO member countries comprised 60% of the UN membership.

[140] Second mention the Spanish language as a working language in the Congress materials.

by the Commonwealth[141] Agricultural Bureaux (CAB), Oxford. The German translation was to be published in early 1957, the French version was expected to be printed in a few months after the German one, and its translation into Spanish remained open. In addition, the text of the ODC was published in other languages: in Dutch and Turkish, and a shortened version in Finnish.

The first set of amendments was adopted by the Committee in July 1956, at its session in Oxford, with their subsequent publication in the FAO's *Unasylva* and *Forestry Abstracts*, as well as some of the lead forestry and timber journals in different countries. It was noted, that 26 countries had already adopted the system at various levels and 5 considered this possibility. In addition, positive results of the consultations with the International Federation for Documentation (IFD) enabled forest editions to be logged at the Universal Decimal Classification (UDC) number 634.0.

Bibliographical Centres. To perform bibliographical work, three international (Oxford, UK, Reinbek, Germany, Washington, DC, USA) and 42 national and regional centres of forest bibliography were set up, and in July 1956, the Committee drafted recommendations for the national centres on compiling national forestry bibliographies.

FAO Multilingual Forest Terminology. The III World Forestry Congress (Helsinki, Finland, 1949) recommended preparing a dictionary of multilingual forest terminology. The FAO Director General asked the Joint IUFRO and FAO Committee to act as a focal point. At its Nancy session (1954), the Committee accepted this task and drew up a plan in consultation with the UNESCO. In collaboration with the Commonwealth Forestry Bureau and the Terminology Committee of the Society of American Foresters, a glossary was prepared; terms and definitions were transferred to cards in accordance with the standard formula, and then distributed. It was expected that the first cards would be available to other countries in early 1957. The English terms with their definitions provided the basis[142]. All terms and definitions had universal reference numbers to associate the basic variants with an unlimited number of other languages. This enabled foresters around the world to have any terminologies they wish. Details were published (Unasylva 1955).

For better organization of the work and providing trustworthy versions in various languages, the Committee enlisted support of different language groups and national committees, set up in accordance with the recommendations of the FAO, IUFRO and 4th World Forestry Congress. By the time of the Congress in London, 34 reports of the national committees had been received. Countries grouped by language: the French group included France, Belgium, Switzerland, and Canada; the German one included Germany, Austria, and Switzerland; the Spanish language group was at the stage of planning.

Coverage List of the International Centres of Forest Bibliography for Periodicals and Series. The Committee planned to publish a new edition of the *Forestry Abstracts Coverage List* (FAO 1953a) – the bibliography of periodicals and books as amended and updated. The list included not only the materials of the Commonwealth Forestry Bureau at Oxford, but also of the Federal Research Centre for Forestry and Forest Products at Reinbek, and the Library of the US Department of Agriculture (Washington, DC) which were also international bibliographic centres. In addition, national forest bibliography centres were asked to expand the amount of information included in the review of periodicals and series not only of purely forestry and non-forestry issues, but also of those having significance to forestry. The success of the plan depended, first and foremost, on the willingness to change – expansion, cooperation, and accuracy of information.

Other matters. The Bibliographical Committee initiated, and the FAO, the XI IUFRO

[141] Commonwealth - a term used since 1946 for the Commonwealth of Nations. From 1931 the term "British Commonwealth" was in use to refer to the former British Empire's dominions, colonies and protectorates included in this interstate association.

[142] This was quite natural as the leadership in this work was transferred from the Flury System (the German language) to the Oxford System (the English language).

Congress and the IV WFC supported the recommendation to editors of forestry publications that the title, the legends to illustrations, graphs, and tables should (unless the original language was English, French, German or Spanish[143]) be translated into one of these languages and that, in such cases, a summary in one of these languages should be also published. To these recommendations, a new one was added by the Committee at its Oxford session, namely, that a note about the writer's professional status should be included in every article. As the response to the earlier recommendations was somewhat slow, at its Oxford session, the Committee decided to request the Director General of the FAO to send a circular letter, containing all the above recommendations to all appropriate centres, asking them to urge editors to adopt them (IUFRO 1956a, p. 20).

Financial assistance from the FAO was requested due to the scale of the work on ODC translation into German, French and Spanish. Although this work was subsidized, the Joint FAO/IUFRO Committee on Bibliography requested additional aid from the FAO for broader application of the ODC for Forestry, coordination of bibliographical work, and clarification of national and language-group terminologies in forestry, bearing in mind the preparation of the Multilingual Forest Terminology.

Section 11 *General forest influences* (Leader: Professor Sir Harry Champion).

Shelterbelts and their effects. It was noted that although there were many gaps in knowledge about establishment, treatment and impact of shelterbelts, it was clear that they were not only a valuable source of wood and other materials for local agriculture, but also played a very important role in protection of livestock and crops, promoting the rational use of available water resources in fields and pastures. While the usefulness of these shelterbelts was particularly important in dry and arid regions, they were properly perceived neither by villagers nor be the general public concerned, nor by governing bodies. It was, therefore, necessary to extend the research on the effect of various types and systems of shelterbelts on crop yields and to use statistical methods and reporting where possible in close cooperation with agricultural stakeholders.

The FAO had already started preparing a review to assess the impact of forests and groups of trees on agriculture for better understanding of the importance of the work, undertaken by forestry. In addition, it was necessary to obtain information about the influence of shelterbelts and groups of trees on the regional climate.

It was also necessary to expand the list of activities in the following areas: a) impact of tree roots on agricultural crops and soils under various conditions; b) control of unwanted competition through irrigation, fertilization, etc.; c) mutual influence of plants and animals, living in shelterbelts, on pests in the neighbouring fields, and so on, which required closer cooperation with scientists from agricultural institutions.

The Section admitted that the issue of sustained management of shelterbelts was almost unaddressed through it became increasingly important. Research was also needed to protect forests against wind. It was deemed highly desirable to include one or more shelterbelt specialists of this Section into the group to visit the Soviet Union[144] in order to integrate its vast experience of shelterbelt management research and practice with the experience of Western countries.

The Congress adopted the following recommendations: "(1). Members should consider the possibility of extending their work to include the fields mentioned above, maintaining close contacts

[143] At that time, Spanish was not an official IUFRO language, but used increasingly.

[144] In 1956, the FAO organized tours to Czechoslovakia and the Soviet Union. The UN Yearbook noted that "The first tour was concerned with silviculture and management problems of mixed and pure forests, methods for preventing or curing the bad effects of monoculture. The second tour, starting with a one-week seminar in Moscow, was to demonstrate the protective role of forests, especially shelterbelts and similar plantations, in semiarid and arid zones, and with the integration of forestry and other land use practices in such areas" (UN 1956, p. 429-430, A.M. 1956).

with agricultural research workers, engaged in addressing similar problems. (2). The FAO should promote requests for technical assistance to further investigations in these fields, particularly in the tropical and semi-arid regions" (IUFRO 1956a, p. 22).

Effect of Forest Cover on Water Supply. The Congress expressed appreciation to the FAO for the dissemination of existing knowledge through publishing a survey, conducted by a team of experienced professionals. It was "recommended that this survey be supplemented with a full international bibliography" (IUFRO 1956a, p. 22). Attention was drawn to the lack of comparative data on the watersheds in dry tropical or seasonally dry regions, and stressed the need to expand these studies to cover these climatic conditions. The Section also stressed the need for cooperation with various organizations and institutions, involved in the management and use of water resources. Particular attention should be given to the theoretical and practical experience in the implementation of the concept of evapotranspiration.

It was recommended that: "a working group should be formed to review the whole subject from the research angle for the purpose of making recommendations as to the most promising research methods, the statistical methods to be adopted and precision to be achieved in the data to be collected, and uniform procedures to be adopted to permit comparison of work done in different countries. "If, however, the establishment of a working group proves impracticable, information on these matters should be collected and circulated to section members, together with notes on progress of current investigations" (IUFRO 1956a, p. 22).

Forest influences in tropical rain forests. The Congress did not receive documents on the subject, although there was a discussion about the deterioration of site conditions if the crown density of trees was too low. The Section was convinced of the importance of studying the influence of forests in the humid tropics, and requested research institutions to pay more attention to this area.

Role of forestry in the scientific program of the International Geophysical Year[145]. The Section Leader said that while six countries had reported about their monitoring of the situation, no specific role had been proposed to forestry. It seemed that meteorologists and other physicists as well as foresters were hardly keen to undertake in such studies. Nevertheless, the data collected were of great interest and value to the study of forest influence on various aspects, and should be considered by all participants[146].

Section 21 *Research on site factors* (Leader: Professor A. de Philippis).

Identification of climate-specific vegetation ranges. "The reason for introducing this topic for discussion was to find a practical means of comparing climatic data with a view to exchanging species between different forest regions, and comparing cultivation methods. The available data do not always meet the requirements of bioclimatology, which must characterise the environment of the forest and silviculture in terms of the climatic conditions. It is recommended that: "(a) Stronger efforts be made to obtain climatic data of greater relevancy from the biological standpoint; (b) Meteorological data to be presented in a uniform manner throughout the world by using, for example, rainfall and temperature charts; (c) An ecological map of world ground cover be prepared under the supervision of the Union, aided by other international organizations; this map could be

[145] The International Geophysical Year (IGY) is the code name of the period during which scientists of the participating countries were observing the physics of the Earth under a unified program and methodology. The first IGY was from 1 July 1957 to 31 December 1958 (18 months). The USSR took part in the event in collaboration with 67 countries. Russia/the USSR participated also in the First (August 1882-August 1883) and the Second (August 1932-August 1933) "International Polar Year" (IPY) as IGY had been called then.
[146]The UNESCO's *Man and the Biosphere* (MAB) Program was launched in 1970 as a follow-up of the International Biological Program (IBP), and since the late 1970s, the biosphere reserves have been established in Russia in the most forested areas.

compiled according to the international world map scale 1: 1,000,000 and the colour-layering method proposed by Mr. Gaussen" (IUFRO 1956a, p. 23).

Site Alterations, Especially Soil Changes, Due to Plantations of Non-Indigenous Species. This issue was raised at the III World Forestry Congress in Helsinki (1949) and discussed in September 1955 at Wageningen (Netherlands) by the working party of the Section. The general idea was to assess the effect of trees on the soil under different geographical, climatic and soil conditions. The Section proposed to establish a permanent working party and include in it other specialists in addition to those participated in the meeting at Wageningen. The Congress endorsed this proposal and established a working party of 9 people, representing 7 European countries and the United States, under the leadership of L.G. Romell from Sweden.

Principles, Recognised by Different Schools of Plant Sociology and Typology and their Application in Silviculture. Despite the unfinished discussions during the IUFRO Congress in Rome in 1953, this area remained in the program of the Section because at the 4th World Forestry Congress (11-22 December 1954, Dehradun, India), a representative of the Soviet Union proposed a research workplan, based on the method of Professor V.N. Sukachev[147], and "a special commission was established to determine the possibilities of adopting the doctrine of forest types, developed in the Soviet Union, in the forestry sector in other countries" (Моисеев, 1986a, p. 49).

The Section discussed these issues in Oxford, and the working party consisted of M. Anić (Jugoslavia), V.L. Harper and C.F. Korstian (USA), G.D.B. Harrison (Canada), E.W. Jones (UK), J. Kostler (Germany), H. Leibundgut (Switzerland), Ch. Letourneux (French Equatorial Africa), M. Ohmasa (Japan), A. de Philippis (Italy), R. Sarvas (Finland), P. Silvy-Leligois (France), and V. Sukachev (USSR).

"This proposal was approved by the Congress and the Union was to review the plan in detail and assess the possibilities to implement it…

"The discussion confirmed the importance of type classification in silviculture, and the working party recommended that the plan of research submitted by Mr. Sukachev should be distributed by the Union in English to all the member institutes. It was suggested that the Forestry Institute of the Soviet Academy of Sciences should also publish German and French translations of the plan. From the institutes which express agreement to take part in a comparative study as suggested in this plan, and by other methods to be devised, a certain number will be chosen to carry out the project" (IUFRO 1956a, p. 23-24).

It should be noted that the scientists from the above mentioned Working Group "had defined their attitude regarding the plan of Professor Sukachev. In accordance with the resolution of this group, an abstract of the project Sukachev annexed to a questionnaire and an informative paper were sent to the member institutes by the President of Section 21…

"As suggested by Professor Sukachev, various methods will be assessed for their suitability under different conditions…

"Sukachev's method is an example of methods, based plant sociology. for determining the biogeocenosis, and taking into account the dominance of species" (De Philippis 1967, p. 277-278)[148]. Altogether, five methods were included in this study: (1) the method of Braun-Blanquet school (field test in Poland), (2) Aichinger's method (Switzerland), (3) Sukachev's method (the USSR), (4) a combined method and (5) a method with an emphasis on research of site factors, especially soil qualities (possibly, Italy, Yugoslavia, Finland and non-European countries). Three

[147] See, e.g., Sukachev's works in this area from 1928 to 1958 in the References (Bibliography) section of this volume.

[148] De Philippis, A. (1967) English summaries: the aim of the group on forest typology: section 21 of the I.U.F.R.O.: condensed report of the forest meeting, held in Warsaw, 1959 // Veröffentlichungen des Geobotanischen Institutes der Eidg. Tech. Hochschule, Stiftung Rübel, in Zürich, 1967, Vol. 39: 277-279.

methods (1), (2) and (3), included for the first period of research (1960/1961), were to be finalized in the summer of 1961. An area of each experiment should comprise about 500 ha, set aside as a block or 2-3 plots.

Ecological factors of natural regeneration in the forest. Presentations and discussions generated many comments, especially from tropical countries, and showed that the study of these factors raised complicated and important issues. The Section "recommended that the topic should be taken up again at the next Congress of the Union and that it should be discussed jointly with Sections 23 and 24 (mycorrhiza working party). Other topics, proposed for discussion at the next Congress, were nutrient requirements of forest trees and reciprocal influence of forest species and root excretions" (IUFRO 1956a, p. 24).

Section 22 *Study of forest plants* (Leader: Dr. C. Syrach-Larsen, Denmark).

Teak (*Tectona*). Three presentations received many comments of foresters from tropical countries. The recommendation was "that further investigation into the flower biology of the teak be urgently made and that provenance trials also be carried out because these would be of great value to all teak growers. Importance was attached to maintaining liaison with the Sub-Commission on Teak, recently created by the F.A.O. Asia-Pacific Forestry Commission" (IUFRO 1956a, p. 24).

Selection of stands and single trees for seed production and breeding. The section received 14 papers and 3 additional reports as well as some other contributions which had not been distributed before the Congress. Various papers triggered a fruitful discussion, focused, primarily, on selection of plus trees and significance of site characteristics for selection of stands and individual trees. Seed supply was very important for many countries, therefore, it was decoded to compile registers of stands and single trees.

"The Section strongly recommended that, since registers of stands and single trees for seed production and breeding would be of great and lasting value in world forestry, each country should, if it had not already done so, begin such work forthwith.

"A proposal to apply for financial support for central collections of plus trees was communicated to the meeting, and it was agreed that Dr. van Vloten and Dr. Syrach Larsen should present this proposition through the Permanent Committee to the F.A.O." (ibid., p.24)

Nomenclature of forest trees. Mr. Matthews, who was present at the preliminary meetings related to the International Code of Nomenclature of Cultivated Plants[149], reported that the trees in plantations did not significantly differ from their wild peers. After discussion, "the following agreements were reached: "(a) There is an urgent need to clarify and fix names of trees of economic importance; (b) Support is given to Dr. Little's proposals for the modification of the existing International Code of Botanical Nomenclature. Dr. van Vloten is requested to send these resolutions to the organizers of the Forest Botany Section of the IX Botanical Congress at Montreal (1959); (c) In the meantime, it is recommended that foresters make use of existing standard lists of botanical names; (d) Members of I.U.F.R.O. should make use of the International Code for the Nomenclature of Cultivated Plants and should support the work of the proposed International Commission for the Nomenclature of Cultivated Plants" (IUFRO 1956a, p. 25).

1938-1944 International Provenance Experiments. After the report of Mr. Edwards, Chairman of the respective working party, the Section: "(a) Considers that the completion of the collection of data regarding the origins of the seed lots employed is of the highest priority, and all the countries concerned are required to facilitate this work so that it can be completed within three months, after which the data should be printed and published; (b) Agrees that the draft code which has been circulated should form the basis for the assessment of the experiments. The minimum

[149] ICNCP –-International Code of Nomenclature for Cultivated Plants – one of the Codes of biological nomenclature is a set of rules, with their basic principles designed by Carl Linnaeus (1707-1778), to govern the formation and use of scientific names of organisms.

assessment required consists of height, basal area, volume (when old enough) and at least one of the simpler expressions of habit of growth; (c) Adopts the sets of photographs (which were exhibited) for the determination of the stages of flushing and recommends that they be made available for distribution; (d) Considers that an assessment, for as many characteristics as possible, should be made in all experiments after the twentieth year of growth from seed, and all countries concerned are requested to cooperate to this end" (ibid., p. 25).

Exchange of Eucalyptus seed. Progress was discussed in the absence of Dr. Goor who was unable to participate in this Congress. Four additional papers were submitted for the discussion. The hope was conveyed that cooperation among Eucalyptus growers would continue.

Proposals for the next I.U.F.R.O. Congress were put forward as follows: "(a) Methods for the mass production of seed; (b) Place of the Mexican pines in silviculture; (c) Provenance tests of Douglas fir (*Pseudotsuga taxifolia*)" (ibid., p. 25).

Section 23 *Silviculture* (Leader: Professor H. Leibundgut, Switzerland). About 100 contributions for discussion were presented with some of them being quite lengthy.

Some of the conclusions and recommendations are presented below:

"Tree classes: Methods of stand analysis. System trees classes, proposed by the working party at Ghent (Belgium), were met with general approval, although they required some improvement. The proposals of Professor Silvy-Leligois on common symbols to indicate progress of the stand development were accepted as a valuable new approach and were recommended for general experimental verification. After these, Professor Sylvie-Leligois would report the results at the next Congress. "The proposals, made by Professors Köstler and Lamprecht for the graphical representation of stands, were recommended for general application, and those of Professor Sarvas - for trial in other regions" (ibid., p. 26).

Assessment of silvicultural measures. It was of supreme importance to define criteria for quality assessment. The goal, set from the silvicultural point of view, differed from objectives of growth and yield studies, as the latter were mainly related to biological and ecological aspects. To define and coordinate the articulation of the problem, it was proposed to establish a working party, representing sections 21, 23, 25 and 31 and consisting "of 4 silviculturists, 2 yield specialists, 1 wood biologist and 1 economist to draw up an international research programme for experiments in tending. Individual quality criteria should be clearly defined." (IUFRO 1956a, p. 26). The detailed analysis of quantitative data according to various criteria required the highest possible degree of accuracy of measurements and computation, as well as a wider application of statistical methods. In this regard, the methods of increment assessment, proposed by Hombert and Arbonnier, were recommended for experimental trial and an eventual further report. Certain concepts of quality and methods of measuring and computing should be standardized. It was recommended that in all comparative experiments in tending, site conditions should always be indicated on the basis of careful investigations of the soil (ibid., p.26).

Establishment and maintenance of forest nurseries: Problems of afforestation. Many problems of local significance occurred in connection with the foundation and maintenance of forest nurseries, which must be solved by countries or regions on their own. Nevertheless, there are many issues related to the basic principles and methods which occur in all areas. They included: a) weed control; b) fertilizers; c) soil structure and water relations; d) methods of transplantation; d) issues of slowing transpiration during transportation of transplants and immediately after planting out.

In addition to these local issues, to some extent addressed in detailed studies, there were other problems, related to reforestation and establishment of pure and mixed forests, especially in arid areas. Those included the following: a) economic and biological suitability of specific species compositions; b) root competition among trees and with other ground flora; c) fertilizers; g) soil

structure and water relations. Together with Section 21, a working party would be established to address issues a), b) and c) with a special emphasis on research in arid areas. The party should include three silviculturists (specialists in forest nurseries and afforestation) and three soil scientists.

"Shortage of labour, rising costs and technical considerations made the problem of mechanisation in large-scale afforestation internationally significant. The results of much local experience are available. These should be collected and passed on to fellow members and to interested designers of machinery. In order to draw up a programme of study, a working party should be formed and should make contact with other international organizations, such as F.A.O." (IUFRO 1956a, p. 27). It was necessary to collect examples of local experience with mechanized operations and to disseminate completed reports before the next Congress.

Section 24 *Forest Protection* (Leader: Dr. H. van Vloten, Netherlands).

Population dynamics. Upon discussion of the reports, the following proposals were approved by the Congress: "(1). The discussion group on population dynamics should continue to work. (2). To establish closer relationship between theory and practice, meetings should be held to discuss theoretical aspects (for instance, the influence of parasites on the host-population and the influence of diseases) to be attended by both applied entomologists and students of population dynamics. Results of such discussions should be communicated to the I.U.F.R.O. discussion group on population dynamics. (3). The Institutes in Canada and Darmstadt should be used as 'clearing houses'[150] in connection with virus diseases of insects. Forest entomologists should be able to identify infected insects and send them to one of these institutes. Important results could be obtained only if there were several infected larvae – it was important for both fundamental and applied research to develop biological pest control practices" (IUFRO 1956a, p. 27).

Test Plantings of Important Tree Species in Several Continents to Assess Resistance to Diseases and Pests. The delegates agreed that increased international cooperation in this field was needed to cope with the intercontinental spread of forest pests, such as *Endothia parasitica*, *Oronartium ribicola*, and *Oeratocyatia ulmi* which caused, respectively, chestnut blight, white pine blister rust, and the elm wilt disease. It was recommended that: "(1). I.U.F.R.O. should encourage literature reviews similar to U.S.D.A. Agric. Handbook No. 100, *Diseases of North American Forest Trees*, these should also include a list of vectors. (2). The Union should encourage pathologists to study diseases of trees occurring in continents other than their own. (3). Test plantings of an important species of one genus, with a view to determining susceptibility to a specific disease (such as oak species in relation to oak-wilt) should be extended. (4). The initial measures in establishing 'new-look' test plantings of the most important tree species of each continent on other continents, should be carefully planned. The test plantings involved were also expected to yield some data of entomological value, although a number of difficulties in this respect were envisaged" (ibid., p.27-28).

The preparation of such projects and programme of work and their coordination required knowledge and services of skilled and experienced forest pest specialists during several years. Professor J.S. Boyce from Yale University, USA, and Dr. H. van Vloten agreed to establish such a working party organize and guide the programme. The hope was expressed that the USDA Forest Service and FAO could provide support and financial assistance to this initiative. Later on, such a working group was established and, as agreed, initially wanted to "concentrate its activities primarily on the diseases of three genera – *Pinus, Populus, and Quercus* – in the North Temperate Zone" (Internationally dangerous forest tree diseases 1963, p. 1).

[150] Clearing House – an organization that collects, sorts and distributes specialized information; in this case – on viral diseases of insects.

Section 25 *Growth and yield, forest management* (Leader: Professor Y. Ilvessalo, Finland). This Section discussed growth and yield in general, as well as their variations with due regard to climatic factors, and methods to estimate timber cuts.

Study of growth and yield. "It is recommended that each country should continue to prepare yield tables, using its own methods, but should at the same time try to develop new techniques which take into account both the site variation and silvicultural treatments applied (especially thinning treatments). It is desirable to compare the results obtained using the classical graphical methods of determining yield and growth with the results obtained using regression analysis. The quality of timber growth should be studied at the same time as quantitative studies are carried out. The question of standardisation of the age when quality classes should be determined was discussed; it did not seem desirable to standardise this at the present time.

"*Variations in yield and growth due to climatic factors*. The papers presented to the Section demonstrated that forest stands have significant fluctuation of increment due not only to climatic variations, but also to factors such as the frequency of seed years and the quantity of seed production. These factors are important in the interpretation of the results of growth study. If necessary, an adjustment of increment measurements to climatic variations should be done by means of tree rings indexes based on the measurements of trees in the same seed-bearing stage as the stands of which the data on increment must be corrected.

"*Determination of actual cuts*. Papers presented at the Congress showed that methods of determining the amount of logging repeatedly changed depending on the condition of forests and the economic situation in each country. Therefore, any conclusions on the matter have not been made, except of the recommendation that each country should publish the results of its research, and others – to learn from its experience.

"*Other matters*. It was agreed that a working party should be formed to study: (a) Standardisation of methods of measurements. (b) The circulation of information on instruments used in forest measurement" (IUFRO 1956a, p. 29).

It should be noted that standardization of measurement methods, referred to in the *Other Matters* paragraph, remained virtually untapped in the materials of the Congress. To fill this gap, it was necessary to look at previous events.

To implement the decisions of the Congress, the working group of Section 25 drafted a report at its meeting at Wageningen in October 1954, and sent it for discussion to interested IUFRO members, as biometrics symbols and measurement systems used in forest inventory were often found in other forest disciplines. The proposals were presented to the group for approval and, with a few minor changes were formally adopted at the meeting of Section 25 during the Congress in Oxford in July 1956 (Soest *et al.* 1965).

"The working party considered that the main objective of standardizing symbols is to make it as easy as possible for readers to understand what an author has to say, particularly when a paper is published in a language foreign to the reader.

General considerations

In making these recommendations on the standardization of symbols, several conflicting interests had to be considered and reconciled, of which the most important ones were: 1. symbols should be easy to remember; they must be simple and there must not be too many; 2. they should be easy to reproduce on a typewriter and in print; 3. they should not conflict with mathematical or other symbols commonly found in forest literature; 4. symbols which have already become well-established internationally should not be altered if possible; 5. symbols should have precise meanings" (Soest *et al.* 1965, p.5).

To be fair, it should be mentioned that the first attempts to discuss standardization in forestry, the introduction of standard symbols and nomenclature of measurements of trees were undertaken by Professors T. Lorey of Tubingen and A. Bühler of Zurich at the first IUFRO Congress in 1893.

Section 31 *Forest economics* (Leader: Professor J. Speer, Germany). After the discussion of the reports, the participants agreed that evidence-based comparisons of the accounting and presentation of balance sheets for various forest operations in different countries were becoming increasingly relevant. In this regard, the main objectives of detailed accounting were: a) preparation of profit and losses accounts; b) assistance in the preparation of data for evaluating the financial impact of forest management activities: preparation of data to compare methods of forestry or similar operations, the financial rotation, costs of production, valuation of standing timber and others.

The Section Leader outlined the main line items, and each of them was discussed separately: personnel and material costs of administration, costs of establishment, logging and roads. One major problem was on deciding on what costs should be proportional, direct or fixed for certain operations or charges. A second important problem was the terminology (conceptual apparatus) due to different interpretation of certain terms.

"It was agreed that three working parties should be set up with the task of recommending procedures for general adoption, as follows: (1) Terminology in cost accounting, and headings in profit and loss accounts (Chairman: Professor Abetz, Germany). This group will work in collaboration with Section No. 01 – Bibliography; (2) Interest and Cost Accounts (Chairman: Professor Hermansen, Denmark); (3) Labour productivity in forest management (Chairman: Dr. Heikinheimo, Finland).

"It was decided that the themes for discussion at the next Congress should be: (a) Profit and loss; (b) Aspects of interest; (c) Labour productivity in forest management" (IUFRO 1956a, p. 29).

Section 32 *Operational efficiency* (Leader: Professor U. Sundberg, Sweden). During the Congress, this Section held two meetings. The first session analysed medical and physiological points of view on the work in the forest. Then, the discussion was opened on the medical point of view, presented by Dr. Lundgren from the Department of Industrial Physiology in Stockholm. Appraisals of energy consumption, caloric intake and oxygen consumption confirmed that forest work was one of the most stressful activities. In the northern temperate regions, the consumed energy could be up to 6,000 calories per day. Much lower energy consumption might be due to malnutrition, poor health, or hot weather, which was experimentally empirically confirmed in tropics, but healthy nutrition and healthcare could bring a noticeable improvement.

Compared with seasonal logging in Scandinavia, lower total energy consumption for harvesting in Central Europe might be accounted for by smaller bodies of workers, different climate, clothing, methods of work, presence or absence of a permanent round-the-year work and other factors. Particular attention was paid to measurement of the physical load on different parts of the body, especially the back, as well as assessment of stress and chronic conditions, caused by forest work. Noise and vibration of power saws were highlighted among new hazards associated with mechanization.

The second session discussed mainly transport and communications, basimg on the report, prepared by Professor Klemencic from Yugoslavia. On the example of Yugoslavia, he gave an overview of the stages of access road development, stressing that the road density determined the profitability of forestry through the volumes and ease of work. The optimum road density was achieved when the cost of construction, maintenance and transport was equal to the cost of mining at the roadside. The discussion showed the options for distances between roads from 100 to over 1,000 meters. In forestry work, density of forest roads and access routes over a certain limit could reduce the total increment, and this was what usually happened in practice. Wider spacing should be left where the increment and cost of harvesting was low or the road cost high.

Another interesting topic was performance ratings and the need to create a working group to continue the study of this aspect because the participants were split into proponent and opponents of performance evaluation. Based on a physiological approach, this area of research could be promising. The section also re-affirmed the need for the terminology of forest work research.

"A visit was paid by a number of members of the Section to the work efficiency unit of the Medical Research Council of Great Britain where interesting experiments were carried out on work under hot and cold conditions, and also fundamental research in the stresses, exerted by the body during work. The members of the Section decided to request that a tour on work efficiency be arranged during the next Congress of the Union" (IUFRO 1956a, p. 30).

Section 41 *Properties of forest products* (Leader: Professor J. Campredon, France). The Section discussed seven reports in two sessions. The first four papers were summarized by their authors, and gave rise to an interesting discussion on changing the length of individual elements of the tree (Scaramuzzi); the influence of site conditions on the quality of wood (Giordano and Curro); the use of specific markers (colours) in the study of the influence of wood structure on mechanical properties of wood (von Pechmann); the presence or absence of lignin in the middle lamella of the cell wall (Palazzo).

The second session considered three reports: the influence of provenance on wood quality (Knudsen); determination, causes, and properties of tension wood (von Pechmann); the influence of site conditions, provenance and silvicultural treatment on wood quality (Quiquandon).

"In conclusion, the Section proposed the following subjects for study at the next Congress: (a) Factors, affecting the growth and formation of wood, to be studied in collaboration with ecologists, geneticists and physiologists; influence of the geographical location and site (particularly moisture in the environment and in the tree). (b) Methods of taking samples in the tree, in the stand, and in the geographical range of a species, for the qualitative study of wood; these methods should differ according to the objectives of study; study of the technological requirements of the timber trade; and biological and forestry problems. (c) Definition of the basic characteristics to be taken into account in technological classification of wood. (d) Study of abnormal wood, particularly tension wood and causes of its formation" (IUFRO 1956a, p. 31).

Organizational matters

The Permanent Committee held its first meeting on Saturday morning, July 7, 1956, before the opening of the Congress. The plenary session was followed with the meeting of the Enlarged Committee, and after that, the meeting of the International Council was held. In the evening, the Minister of Agriculture, Fisheries and Food of the United Kingdom gave a reception for the delegates.

Sunday was devoted to exploring the city of Oxford and the Cotswold Hills College. The next three days were dedicated to the meetings of the Research Sections. On Thursday, July 12, the Congress delegates could visit, alternatively, one of the institutions: the Forest Experiment Station at Alice Holt, Agricultural Experiment Station at Rothamsted or the Forest Products Laboratory at Princes Risborough.

On Friday, July 13, 1956, the delegates worked in Sections and Working Groups; the second meeting of the International Council was held. The second plenary session (closing of the Congress) took place on the following day, July 14. After the Congress, the participants were offered seven routes for the study tours in the country.

During the Permanent Congress, the Permanent Committee held its 10th session, consisting of several meetings which were hosted by the Headquarters of the Forestry Commission, Imperial Forestry Institute at Oxford, and the Forest Research Institute at Alice Holt, Hampshire (the extraordinary meeting on July 12, 1956). The session was attended by IUFRO President A. Pavari

(Italy), Vice-President H. van Vloten (Netherlands), and the following members of the Committee: K.L. Aggarval (India), J. MakDonald (UK), M. Kreutzinger (Poland), V.L. Harper and C.F. Korstian (USA), A. Oudin (France). Previous President H. Burger (Germany) was unable to participate, and L.A. Tortorelli (Argentina) vacated his place in the Committee. In addition, the session was attended by representatives of the FAO: M. Leloup and I.T. Haig, as well as IUFRO Technical Advisor A. de Philippis (Italy) and FAO Secretary L.J. Vernell.

The enlarged meetings were also attended by the Leaders of the Research Sections. Upon approval of the agenda and reports for the elapsed period, approval of new members and the Congress opening procedure, the Committee discussed and approved the report (by I.T. Haig) about cooperation with the FAO, President's Annual Report and the financial report; decided to leave the size of the subscription fee unchanged, reviewed membership applications, nominations for the President and Vice President of the Union, members of the International Council and other proposals to be submitted to the International Council.

At its Ninth Session, the Permanent Committee confirmed the decision to submit to the International Council its proposal to the introduce a new category of IUFRO membership - Corresponding Members.

To have wider geographical representation in the Permanent Committee, it was recommended to extend the international character and IUFRO's influence, "the Committee recommended to the International Council that two additional places should be filled by representatives of member institutes in Japan and Belgian Congo" (IUFRO 1956a, p. 4) as well as recommended to elect Professor Uzacategui (Dean of the Forestry Faculty, University of Los Andes, Mérida, Venezuela) to the place vacated by Dr. L.A. Tortorelli.

In addition, the Permanent Committee agreed to recommend to the International Council that a member of the Committee should not be the Leader of a Section at the same time. In view of this and the announced retirements, it was recommended to elect new Leaders of the Sections, respectively, 11 – Professor H.G. Wilm (USA), 24 – Professor A. Biraghi (Italy) and 25 – Professor F. Firat (Turkey) to replace Sir Harry Champion (UK), Dr. H. von Vloten (Netherlands) and Professor Y. Ilvessalo (Finland).

"23. In keeping, also, with the principles that the representation on the Permanent Committee should be as world-wide as possible, the Committee recommended to the International Council that the place vacated by Mr. J. Macdonald, if elected new President of the Union, should be filled by the Chairman, when elected, of a Research Committee of F.A.O.'s Near East Forestry Commission. This committee will coordinate activities of the Near East Research Organization now being established under the sponsorship of F.A.O., with its centre in Damascus, Syria.

"24. Pending the election of the Chairman of this Research Committee, the International Council might authorize the President, on the advice of the Permanent Committee, to fill this vacancy in its membership on a provisional basis, if such a course appeared to be desirable in the interests of the Union. The International Council subsequently rejected this proposal and elected Professor Naslund (Sweden) to the place on the Permanent Committee that would be vacated by Mr. Macdonald." (ibid., p. 4).

It was proposed to leave the decision about the time of the 14th IUFRO Congress to the new President and the Permanent Committee, as the 14th IUFRO Congress might coincide with the 5th World Forestry Congress[151].

[151] The World Forestry Congresses (WFC) have been held since 1926. Starting from the Second WFC (1949), they are held under the auspices of the UN FAO once in 6 years while the IUFRO Congresses are convened

The International Council meeting was held on July 7, 1956 at the Regent's Park College, Oxford; it considered and adopted the reports on the work of the Union for the period from the 1st January 1954 to July 1956, left the annual contributions of Ordinary and Associate Members unchanged, and approved the merge of Section 42 into Section 41, charging this united Section with new responsibilities and giving it a new name - *Biology, Chemistry and Physics of the Properties of Forest Products*.

One important thing was that IUFRO President Professor A. Pavari proposed, and the International Council wholeheartedly approved the election of Dr. Hans Burger Honorary Member of the Union. Also, the Council expressed sincere thanks to Professor A. de Philippis for his work as the Technical Advisor.

At the next meeting, in the morning of 13 July, held in the Imperial Forestry Institute, Oxford, the Council discussed new members of the Union and a significant increase in their number, recognizing the merits of the U.S. Forest Service: its Federal Forest Experiment Stations increased the IUFRO membership. The Council approved (Article 3 of the Statutes) the new category (Correspondent Member); and the Associate Member category was to be assigned to individual scientists whose organizations, for various reasons, were not IUFRO members. "The need was felt to associate formally with the Union a limited number of individuals from research institutes, or engaged in research, in fields, closely related to those of the Union such as botany and soil science, and who made or were making a distinct contribution to research projects of the Union. The Section Leaders would have the authority to put forward nominations for Corresponding Members, and membership could be accorded by the President on the advice of the Permanent Committee. No subscription fees would be levied for this category of membership" (IUFRO 1956a, p. 5).

Cooperation with the FAO was deemed fruitful.

The Council approved the candidates for Presidency and Vice-Presidency, proposed by the Permanent Committee – they were, respectively, Mr. MacDonald (Director, Research and Education, Forestry Commission, UK) and Dr. H. van Vloten.

The third meeting was held on the same day in the afternoon at the Imperial Forestry Institute, Oxford. The International Council approved the proposals of the Permanent Committee on the number of members and composition of the Permanent Committee and the Section Leaders.

"In the place to be vacated by Mr. J. MacDonald, the Council elected Professor M. Naslund (Senior Director, Forest Research Institute, Stockholm, Sweden) to be a member of the Permanent Committee" (IUFRO 1956a, p. 9).

An important decision was made concerning the Union's world-wide expansion of the membership. Thus, representation in the Permanent Committee should be adjusted accordingly. "This point had been raised at the 11th Congress for consideration by the Permanent Committee. The Council decided to go beyond the Committee's recommendations, and to increase the ordinary membership from seven to eleven. In addition to the four new places created on the Permanent Committee, the Council elected Professor M. Ohmasa of Japan; a representative of the National Research Institute of Agriculture of Belgian Congo; Professor A. Horky of Austria and Professor T.Bunusevac of Yugoslavia... "It also approved the principle of rotation of membership on the Permanent Committee. No member would ordinarily be eligible for re-election more than once, but provision would have to be made for overlapping terms so as to ensure continuity in the management of the affairs of the Union. The new Permanent Committee was charged with incorporating appropriate amendments into the Statutes of the Union, to be submitted to the next session of the International Council" (IUFRO 1956a, p. 9).

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once in 5 years. According to the Agreement between the IUFRO and FAO, in the case of coincidence of the two Congresses, the IUFRO shall hold its Congress earlier or later.

The same approach for the terms in the office, re-election and rotation was approved for the Section Leaders; it also approved the proposal of the Permanent Committee authorizing the President to designate the Deputy Leaders for Research Sections if proved desirable.

"As alternative method of spreading the work-load and responsibilities of Section Leaders was the creation of special working groups. This procedure had already been adopted by some Section Leaders and did not require authorization from a higher level" (ibid., p. 10).

The proposal of the representative of Austria to hold the 13th IUFRO Congress in Vienna "at a date to be decided later" was adopted (ibid., p. 10). The Congress also "decided to leave in the hands of Mr. Macdonald the manner and form of reproduction of the Proceedings of the Congress and of the technical papers submitted to the Congress" (ibid., p.3). But later, a representative of the International Council "raised the point of advance distribution of papers not only to Member Institutes but to all individuals, attending the Congress. This will be of concern in preparations for the next Congress" (ibid., p.3).

The second plenary session and closing of the Congress was held on July 14, 1956 under the chairmanship of Professor A. Pavari, who led the meeting in French. At the meeting all the three official languages of IUFRO were actively used.

Professor A. Pavari gave the floor to Professor E. Saari to report about the Joint FAO/IUFRO Committee on Bibliography. He gave a brief account of major tasks of the Committee, and presented the Committee's recommendations to IUFRO, FAO, and World Forestry Congresses (IUFRO 1956a, p.100): "The Committee makes the following *Recommendations* for adoption by the Congress:

"First: The Congress draws the attention of the F.A.O. to various projects of the joint F.A.O./I.U.F.R.O. Committee on Bibliography requiring further financial assistance from the F.A.O.

"Second: the Congress requests the President of I.U.F.R.O. to remind I.U.F.R.O. members of the continuing need to afford every assistance to the work of the joint F.A.O./I.U.F.R.O. Committee on Bibliography in the interests of: (a) The broader application of the Oxford system of decimal classification of forestry; (b) The international co-ordination of bibliographical work and in particular to expedite; (c) the clarification of national and language group terminologies in forestry, as an essential contribution to the Committee's work in preparing the multi-lingual forest terminology. *(Adopted.)* After that, the reports and recommendations of all Research Sections were delivered.

Before closing the session, Professor A. Pavari gave the floor to Professor Kreutzinger from Poland who announced the Polish government decision to give a pair of European bisons to the Forestry Commission of Great Britain. In turn, Sir Henry Beresford-Peirse sincerely thanked Poland for the gift and assured the Polish Government that these "extremely rare and magnificent animals… will flourish and increase, just as we hope that the Union itself will flourish and increase" (IUFRO 1956a, p. 109).

After that, Professor Julius Speer invited the participants to celebrate the 75th anniversary of the Bavarian Forest Research Institute at the commemoration scientific conference at the University of Munich from 24 to 27 October 1967.

Professor Aldo Pavari chaired the Congress Closing ceremony and underlined the remarkable success of the Congress, manifested not only in the number of participants, but also in the value of the reports, and all the work that had been completed by various Sections and the excellent job done by their Leaders. He expressed his gratitude to the Congress organizers – the UK colleges and offices, city of Oxford, Imperial Forestry Institute, Congress Organizing Committee, and the UK Forestry Commission.

He extended special thanks to the FAO Forest Division, pointing out that the FAO was referred to several times during various official meetings as an example of close collaboration

between the two organizations, and articulated the feeling that these relations would always be cordial and fruitful in the future.

Finally, he addressed his affectionate thanks to Professor de Philippis who collaborated with him as Technical Adviser and who always gave him very valuable help.

Then, Professor Eric Lönnroth said that he often and fondly remembered IUFRO Ex-Presidents Ph. Guinier (France), G. Roth (Hungary), and H. Burger (Switzerland), who "worked together in the Association for a long time and, in particular, in the Permanent Committee. He said: "*Famiglia Forestari*"[152], as we called ourselves then. We have witnessed how the Association has become a successful organization that can look forward with confidence" (IUFRO 1956a, p.110). He also underlined that Professor Pavari had done a great job as IUFRO President, and wished success to the new President, to Oxford and the country.

Professor Franz Hafner (Austria) spoke on behalf of the German-speaking participants in this Congress, and as a representative of the country to host the next Congress, he underlined that all Austrians were particularly pleased to have the honour to host the IUFRO Congress in Vienna.

The next speaker was Professor Auguste Oudin (France) who expressed many thanks to the Congress organizers, President, Vice-President and Technical Advisor, and wished success to the newly elected President and the International Union.

Professor Hardy L. Shirley (USA), on behalf of the English-speaking participants, particularly, noted the excellent work of the organizers, especially, Lady Champion and Mrs. Ford Robertson, for their lead of the "women's program" that included many excursions and some shopping, as well as the excellent work of the translators "without whose excellent services many of us, English-speaking people would have been left very much out of what was going on" (IUFRO 1956a, p. 113).

Professor Sir Harry Champion (United Kingdom) continued to talk about the translation during the Congress, and also said: "You, Mr. President, and the spokesmen of the three language groups of this Conference have made kind references to the facilities that the University of Oxford has been able to offer for this meeting. I must admit that when it was proposed that the Conference should come here, the first thing that we thought of was what will those attending the Conference think of the limitations of the accommodation and facilities that we could offer you" (ibid., p. 113). He apologized for any inconveniences; though the organizers tried to do their best having various limitations, including facilities to offer, and they hoped that the weather would be fine for the follow up days – time of excursions.

Sir Henry Beresford-Peirse, Deputy Director-General, Forestry Commission (UK), replaced Sir Arthur Gosling at this session, and on behalf of Lord Radnor (The Earl of Radnor), the Forestry Commission and Her Majesty's Government joined all what was said to the Congress itself and IUFRO and other organizations, expressed deep appreciation to delegates and guests for the visit to his country and congratulated on the success of the Congress. The last message from Professor Pavari was about the term of the new governance of IUFRO valid from January 1, 1957 and wished all participants safe trip back home and lovely time during the post-Congress excursions.

The next Congress would be held in Vienna, and the time would be agreed afterward.

Dr. James A.B. MacDonald (1957-1961) from the United Kingdom was elected IUFRO President.

Resolutions

The Congress did not adopt any resolution, and all the decisions and recommendations of the Congress were adopted by the Permanent Committee, International Council and Research Sections.

[152] *Famiglia Forestari* (Italien) – Forest family.

Excursions

The excursion program (July 15-22, 1956) was very rich. The tour leader for each direction was well-known expert in the given field. A brief description of the routes is based on the Congress report (IUFRO 1956a, p. 127-129).

Route 1. Northern Scotland (Leader: Professor H.M. Steven; Assistant: R. Faulkner).

The tour started in London (Kings Cross Station). In the morning of Sunday, 15 July, 1956, the group went by train to Aberdeen where they spent two nights (July 15/16, 1956) and on July 17-20, 1956, they were in Forres.

The participants visited the Macaulay Institute for Soil Research, dealing with issues of landscape, soil and water resources and their protection. Another destination was the University of Aberdeen, its Soil Sciences and Forestry Departments. Outside Aberdeen, the participants visited the arboretum of exotic conifers in Durris; visited natural forests of Scots pine and experiments exploring its morphological variation in Glentanar; visited sites with large afforestation with examples of gradual die back of European larch in Clashindarroch; in Newton, a large nursery was demonstrated: it had a forest seed orchard and area for nursery experiments.

Then, the participants grew acquainted with heather cultivation experiments on poor upland soils and visited: heather nurseries at the Teindland Forest; places of ploughing of moorland prior to planting at Speymouth Forest; sites of studying soil moisture in the dunes of Culbin Forest; experimental work on afforestation on peatlands at Inchnacardoch Forest; growth of Sitka spruce stands (*Picea sitchensis*), Douglass fir and *Abies grandis* at Portclair Forest; as well as areas of natural regeneration of Scots pine and European larch at Seafield estates. Naturally, it was impossible to pass by the Loch Ness, Cairngorm Mountains and other attractions. On the way, entomological problems were demonstrated. The tour ended on July 21, 1956, at Aviemore, from where the participants returned by night train to London.

Route 2. Central and Western Scotland (Leader: Mr. M.V. Edwards, Assistant: R. Lines).

The tour started from London (Euston Station). Early in the morning, on Sunday, July 15, 1956, the delegates arrived to Perth where they stayed overnights on July, 15-17, 1956, on July 17, 1956, they in Pitlochry, and two more nights (July 18h-19. 1956) were spent in Dunoon.

The group visited the Forest Training Schools at Faskally and Benmore, hydroelectric plants and fishery research station (brown trout). Then, they visited plantations of European, Japanese and hybrid species of larch at Dunkeld; provenance experiments with European larch and other species at Drummond Hill; sites of mechanization of nursery operations in Ledmore Nursery; relict Scottish pine forests in the Black Wood of Rannoch; nursery, plantations of *Eucalyptus* species, and experimental plots of various conifer species in Crarae Estate; research sites to monitor the growth of exotic conifers on the Atlantic coast in Inveraray and Benmore; Swedish *Ari* sawmill, using biomass from thinning of coniferous plantations in Glenbranter. On Saturday, July 21, 1956, the participants took a night train from Glasgow to London.

Route 3. Southern Scotland (Leader: Dr. J.A.B. MacDonald, Assistant: G.M.L. Locke).

The tour started from London (Euston Station). On the morning of July 15, 1956, the participants arrived at Dumfries where they spent two nights of 15th and 16th, then, one night in Peebles, nights of 18th and 19th in Edinburgh, and then one night of 20th at Kelso.

In Edinburgh, the group had a sightseeing tour in the city, and visited the University, Royal Botanic Garden, and some other objects. Further, in the Dumfries district the tour participants visited the main object of the tour – afforestation of Molinia peatlands. Other targets were stands of Sitka spruce and other species, experimental plots with various mixing of tree species. From forest industry, the point of interest was a particleboard plant built for more efficient utilization of wood from thinning in young stands. Other objects were houses built for forest workers in newly-equipped forest village, areas affected by fires, with the group-dying coniferous stands in Moorburnhead,

growth of various conifers in plantations, experiments in creating nature-like (irregular) forests at Glentress area, different species and plots of exotic conifers at Dawyck, heathland nursery at Devilla, experiments in shelterbelts at Bush, effect of exposure to winds from the sea in Gosford, sample plots of Norway spruce at Bowmont Forest, diverse broadleaved and coniferous forests and natural regeneration at Kyloe, and finally, a very large afforestation area mainly of spruce at Kielder. On Saturday, July 21, 1956, the participants took the night train from Newcastle to London.

Route 4. Eastern England **(**Leader: Mr. G.W. Backhouse. Assistant: M. Nimmo).

On Sunday, 15th July, the participants travelled by bus to Cambridge, another University town of England, where they spent the whole week. The first excursions were in the town and campus of the University. The group visited forests in the neighbourhood, returning each evening to Cambridge.

The first visit was to a well-established hardwood forest on clay soil at Hazelborough. Then, two days were spent in Thetford Forest where the group visited a large area of afforestation on sand overlying chalk, plantations of Scots and Corsican pines, beech and oak, and experimental plots of various exotic tree species. From forest protection point of view, the participants were able to see consequences of root disease caused by the fungus (*Fomes annosus*), on-going work on poplar canker, removal and utilisation of wood from thinning as well as the system of fire protection. At Lynford Hall, the participants visited a Forester Training School. Half a day was spent on the visit to a private estate at Ryston, where the group could see a large collection of poplars. The creation of broadleaved forests on heavy clay was studied at Rockingham Forest, and in the Corby area – the problem of afforestation of the open-cast ironstone workings. The final day was spent in the beech woods of the Chiltern Hills. In the evening of Saturday, 21st July, the group came back to London.

Route 5. Southern and South-eastern England (Leader: Mr. O.J. Sangar, Assistant: J.M.B. Brown). On Saturday, 14th July, the party travelled by bus from Oxford to Salisbury, to Lyndhurst in the New Forest (nights of 15th-16th), to Bognor on the South Coast (17-19 July), to a well-known inland resort of Tunbridge Wells (20th July).

The group visited Longford Castle (The Earl of Radnor), Arundei Castle (Duke of Norfolk) and the cathedral in the City of Winchester. The participants saw conversion of hazel coppice to beech at Gardiner Forest; a heathland nursery and experiments in the nursery as well as plantations on strongly podsolised Eocene sands at Wareham Forest; management and silviculture in a forest of historic and amenity value at the New Forest; remarkable plantations of oak and conifer tree species at Forest of Bere; creation of beech plantations on chalk at Queen's Forest of Buriton and at Slindon Forest; chestnut and hazel coppice as well as growth of conifers on different soil types at Cowdray estate, splendid stand of beech in Slindon Park; oak stands establishment on heavy soils at Chiddingfold; small forest with various exotic tree species at Gravetye; National Pinetum and forest plots of many different species at Bedgebury, and, finally, an intensively managed small private estate at Redleaf. In the evening of Saturday, 21st July, the group returned to London by bus.

Route 6. West and South-West England (Leader: Mr. W.H. Guillebaud, Assistant: J.R. Aldhous). The tour started on Saturday, 14th July. The participants travelled by bus from Oxford to Monmouth where they spent nights of 14th-16thJuly, then to Gloucester (17th July), to Taunton (18th July), to Exeter (nights of 19th-20th July).

The excursion agenda included conversion of coppice to high forest; experimental plots of Norway spruce and European larch; experiments with cultivation of oak, ash and sycamore; group-dying conifer stands at Tintern Forest in a limestone valley. Then, the participants were demonstrated cultivation of oak; plantations and sample plots of different conifer species, and National Forest Park Camp at Forest of Dean; well-managed private stands in Garnons estate, specialising in ash; management of beech forests on a Jurassic limestone area at Kingscote Estate, well-known collection of trees and shrubs at Westonbirt Arboretum; cultivation of basket willows

at North Curry; scaled trials with poplar clones and resistance of conifer trees to the honey fungus (*Armillaria*) attacks at Quantock Forest; planting of European larch under the canopy with various other tree species, including the southern beech (*Nothofagus sp.*) at Haldon Forest; plantations of western heaths at Dartmoor; well-managed estate with plantations of redwood (*Sequoia*) and other species, and treatment of poor oak coppice at Dartington Hall. In the afternoon of 21st July, the participants visited the Bath district with its ancient Abbey Church and Roman Baths. The group took a night train from Plymouth and arrived in London in the morning of 22nd July.

Route 7. North Wales (Leader: Professor E. C. Mobbs, Assistant: G.D. Holmes).

On Saturday, 14th July, the group travelled by bus from Oxford to Stratford-on-Avon and to Shrewsbury (the night of 15th July), to Lake Vyrnwy (16th-17th July), to Machynlleth (18th July), to Betws-y-Coed (nights of 19th-20th July) and returned to London on 21st July.

The tour included such forestry sites as the heathland nursery at Kinver Forest, pine plantations, attacked by pine looper moth (*Bupalus piniarius*) at Cannock Chase; very large trees of redwood (*Sequoia*), true fir (*Abies*) and other species, as well as different plantations of unusual species at the Leighton Park estate; afforestation in the catchment area of Liverpool[153] at Lake Vyrnwy; small woodlands at Mathrafal Forest; ploughing in support of afforestation at Dyfnant; afforestation area, housing of forest workers, and slate quarries at Dovey Forest; co-operative arrangement among small owners at Dovey Woodlands; vast afforestation area of various conifers species, poplars and broadleaved trees in the valleys, and design of silvicultural experiments at Gwydyr Forest; beginning of experiments with planting on peats, and forest garden at Beddgelert Forest; Coastal sand dunes and plantations at Newborough Warren. As part of the social program, the participants could go to the first Shakespeare Memorial Theatre at Stratford-on-Avon, and visit the Caernarvon Castle, new Forestry Building at Bangor University, and the Snowdon Mountains.

Soviet/Russian participation

According to Professor I.S. Melekhov "active participation of scientists from our country in IUFRO resumed at the 12th Congress (1956). It should be specifically noted that Academician V.N. Sukachev played a big role in this, both organizationally and in terms of his direct involvement in the development of international scientific research. At this Congress, held in Oxford (England), attended by V.N. Sukachev, forest typology was expressly addressed. The program and instructions for a field study of forest types, prepared by V.N. Sukachev, was copied and disseminated by the UFRO in 1959 to forest research institutions in different countries" (Мелехов 1972a, p.169).

The Forest Institute of the USSR Academy of Sciences, headed by Academician V.N. Sukachev, was founded in Moscow in 1944 and joined IUFRO in 1947. "At present, its successor, the Institute of Forest and Timber, the Siberian Branch of the USSR Academy of Sciences [located in Krasnoyarsk], is a IUFRO member" (Мелехов 1972b, p. 89).

Interesting facts

After the Congress in Rome, the Union had made significant progress: its membership had increased from 96 member organizations in 40 countries to 145 members, including 139 permanent and 6 associate members in 48 countries with 21 from Europe and 27 from other continents.

After the Stockholm Congress of 1929, it was the second Congress, held not in the traditional season for foresters (September), but in early July. This was, most likely, accounted for by the weather conditions – cool from the Ocean and less precipitation compared to September.

[153] The city area was over 110 square kilometers or 11,000 ha.

Chapter 18
Congress XIII - September 10-16, 1961, Vienna, Austria

The information for this Chapter was drawn from the Proceedings of the 13th IUFRO Congress, published in Vienna (IUFRO 1961a-e), and articles of the Congress participants: P. Arbonnier (1961), M. Motte (1961), I.S. Melekhov and V.G. Chertovskoi (1961), and A. Métro (1962).

Overview

For the third time in the Union's history, hospitable Vienna welcomed its Congress. According to the official data (IUFRO 1961a, IUFRO 1992), it was attended by 410 delegates (482 – with family members) from 39 countries[154].

The largest delegations were from the hosts of the Congress – Austria (89 people), neighbouring Germany (the FRG and the GDR) with its 50 delegates and the USA (30 people), followed by Sweden (21), Yugoslavia (18), the United Kingdom and Norway (17), Finland (16), Belgium (13), France (12), Denmark and Switzerland (11), Italy, the Netherlands, and Turkey (10), Canada and the Soviet Union (9), Japan (6), Czechoslovakia (5), other countries sent at least five delegates each. Representatives of the FAO (7 persons) were listed in the Italian delegation, thus the total number of the Italian delegates was 17.

At that time, IUFRO united 149 permanent members from 50 countries, five honorary members, 6 associate members and 17 corresponding members. Considering the fact that by the end of 1961, the United Nations Organizations included 100 Member States (UN 2013)[155], the forest research institutions from half of those countries were IUFRO members – the highest share of the country level representation in all years since IUFRO's foundation.

The agenda included 5 sessions with 2 plenaries (the opening and closing sessions), 191 reports and 3 excursions (IUFRO 1961a-d). The Congress participants noted: "An immense preparatory work was conducted by the Congress Organizing Committee and, especially, representatives of the official forest scientific community in Austria: Chairman of the Organizing Committee Dr. R. Ender, Vice Chairman Dr. H. Dürr, Secretary O.Bein and others" (Мелехов, Чертовской 1961, p. 167). On the eve of the Congress, September 10, 1961, the Enlarged Committee's meeting was held.

Scientific program

In the morning of 11 September, 1961, the Congress was opened at the Palace of Industry (Schwarzenbergplatz) under the chairmanship of IUFRO President James MacDonald who welcomed the delegates.

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[154] Motte (1961) mentioned 372 delegates from 31 countries, A. Métro (1962) wrote about 360 participants, representing 36 countries and 120 research institutions, Forestry Chronicle (1961) referred to 392 delegates from 41 countries, including 30 from the USA and 9 from Canada.

[155] Mauritania, Mongolia, Sierra Leone, and Tanganyika became members of the United Nations in late September - mid-December of 1961 (UN 2013).

Austrian Federal Minister of Agriculture and Forestry Eduard Hartmann said that it was a great honour to welcome delegates in Vienna. He made a brief excursion into the history of IUFRO, and reminded delegates: "The idea of this Union was first expressed in Vienna in the year 1890, on the occasion of an agricultural congress. The first Congress of the Union of Forest Research Organisations was then held - also in Vienna - in 1893, and another one in 1903. We may therefore proudly say that it is now for the third time that we have the pleasure of welcoming participants of a IUFRO Congress to our city" (IUFRO 1961a, p. 97).

Then, he mentioned that Austria was self-sufficient in terms of timber supply, having 21 million ha of forests, but after World War One, the forest area shrank to only 3.1 million ha. The crisis, World War Two, over-harvesting and neglect of forest resources kept the situation unfavourable for the country's economy. The new approach to the forest sector with the support of the Marchall Plan helped to attain good progress in reforestation and reconstruction of the economy.

Geographical and climatic conditions had created a very specific site conditions and various vegetation zones in Austria - from arid Pannonia with 500-600 mm of precipitation to 2,000 mm in western Austria, and from the highly elevated Ötztal Alps in Tyrol (2,000 m above sea level) to 115 m in the Seewinkel, Burgenland.

He illustrated the ownership pattern and the situation in the forest sector in the country: "57% of the existing 400,000 agricultural and forest enterprises include wood lots; 73 % of the total wooded area is the property of private forest owners. Half of it is farm woods which are divided into small individual lots." (ibid., p. 99). To make the forest sector more efficient, some measures were undertaken: the Forest Seed Law was passed in 1960, the country put in place the National Forest Inventory on a ten-year basis, "using the sampling method with a mathematical statistical framework" and surveys for forest mapping, torrent and avalanche control and other measures, and forest research.

The speeches were made by IUFRO President James A.B. MacDonald, Vice President Dr. van Vloten, Professor J. Campredon, representative of the Federal Ministry of Education Dr. Hoyer, Deputy Mayor of Vienna Mr. Slavik, who made an extensive overview of the City of Vienna over time and space, Rector of the BOKU University Professor Dr. Kar.

On behalf of Dr. Egon Glesinger, Head of Forestry and Forest Products Division of the FAO, Dr. A. Métro talked about the IUFRO and FAO partnership and stressed the importance of not only forest research, but also its value for everyday life, referring to such emerging challenges as global population growth and hunger in developing countries. He called the forest research community to contribute to the world-wide Freedom from Hunger Campaign[156] as well as to the concentrate on the chief fields, including forest products. Talking about hunger, Mr. Métro underlined that forests were a very significant instrument to fight hunger because of their influence on the climate, conservation of soil and water, and, hence, on agricultural production and, at large, on economic and social development.

He also mentioned: "In the past year, the production of round timber for industry exceeded one milliard cubic m for the first time. Annual production has risen during the last year from 940 million cubic m to 1.04 milliard cubic m. Despite this, however, it is a fact of considerable importance that the rise in timber production (15 %) over the past ten years has been considerably less than the rise in the total production (30 %); If – as is the fashion now – we go on to consider the figures for the rhythmical increase in the population till the year 2000 – this long-term policy comes naturally to us foresters and forest planners – and even further that by the year 2000, the world

[156] For fighting famine means not only fighting the material hunger but also the hunger for all other needs, since "man does not live by bread alone" (ibid., p.107).

population and perhaps also individual consumption will perhaps have doubled[157], can we then answer the question whether the forest will be able to meet the correspondingly increased requirements? Will foresters and forest owners by then be able to solve the resulting political problems, those of finance and investments and lastly the technical ones? We can affirm this only if all pertinent questions are brought before your forest research institutes in good time, and if the latter have the means to solve those problems" (IUFRO 1961a, p. 106-107).

After this presentation, the President made an announcement that two former Presidents of the Union Professors G. Roth and A. Pavari had passed away[158], and Secretary O. Bein described the program of the Congress. In the evening of the same day, the Congress delegates had a reception, given by the Mayor of Vienna in the Vienna City Hall.

The scientific program included 12 sub-plenary presentations on key issues, including forest management, recreation and forest protection, reforestation and remote sensing methods in research, mechanization and even the *Forest and Man* theme. The work was organized in 10 sections where many reports were presented, and the Sections reports were included in the Proceedings of the Congress.

Section 01 *Bibliography and terminology* (Leader: Professor E. Saari, Finland). Basically, the section worked in close collaboration with the FAO as the FAO and IUFRO cooperated in the Joint Committee on Bibliography. The full English text of the Oxford Decimal Classification for Forestry, approved by the IUFRO Congress in Rome in 1953, was published by the Commonwealth Agricultural Bureau, England, in 1954, and in 1957, an agreement was reached about its entry into the Universal Decimal Classification at UDC number 634.0. After the IUFRO Congress in 1956, it was published in German, Spanish and French; Portuguese, Italian, Polish, and Turkish versions were under preparation; and in other languages, it was published in abbreviated versions.

Following IUFRO's recommendations, after the 4th World Forestry Congress, the National Bibliographic Centres were established in many countries and began to translate the English cards with terms in their native languages and communicate with international centres. The first cards were issued at the end of 1958. Since then, 300 base cards in English were prepared and distributed to 27 institutions in 22 countries and the list of recipients was further expanded. "Full details of the overall plan and working procedure of the project were first published as an article in Unasylva 9(4) titled: *Multilingual Forest Terminology*. An up-to-date re-statement was presented in a paper at the 13th IUFRO Congress alongside with reproduction of sample cards" (IUFRO 1961a, p. 139).

The Committee also recognised that there was a great and growing need for a glossary of forestry terms, including at least the official languages of the FAO and IUFRO for the increasing number of forest specialists, working under projects, financed by the UN and other funds.

The Committee's recommendation read as follows: "The Committee, therefore, recommends that both the F.A.O. and E.C.E. consider the possibilities of financing such a stop-gap multilingual glossary. It could be prepared by a small group of experts within a few months, with the help of the two English terminologies, other good terminologies, the existing cards of the Multilingual Project and the four language editions of the Oxford System of Decimal Classification for Forestry. It would incorporate only terms, not their definitions" (IUFRO 1961a, p. 140).

Regarding the World List of Forestry Periodicals and Serials, it was noted that since 1953, when the FAO published the first list, prepared by the Commonwealth Forestry Bureau for Forestry

[157] The World population between 1961 and 2000 increased from 3.183 to 6.128 billion people, but industrial roundwood production increased from 1.018 billion m^3 to 1.684 billion m^3, and the total consumption, consecutively, 2.517 and 3.455 billion m^3 (FAO 2015).

[158] Professor Gyla Roth (1873-1961) and Professor Aldo Pavari (1888-1960).

Abstracts (*Forestry Abstracts Coverage List*), the new versions were published by the FAO in 1960 and at the end of 1961.

The Section also reviewed the classification and cataloguing of forestry films. "At the Committee's initiative, the FAO, IUFRO and the 4th World Forestry Congress have recommended to editors of forestry publications all over the world that the title, the legends to illustrations, graphs, tables etc. and the summary of each article etc. should also be given in English, French, German or Spanish, wherever the original language is not one of these. The professional status of the author should also be given. The Committee has noted with satisfaction that such practices are becoming more common. In order to improve the utility of this kind of information, at its meeting in Vienna in 1961, the Committee decided also to forward to these editors an additional recommendation to the effect that the working address of authors of more important articles be published alongside with their names. In this way, it would be easy for interested persons to promptly contact with any author" (ibid., p. 141).

Section 11 *General forest influences and watershed management* (Leader: G. Storey, USA) had two sessions and discussed 11 papers submitted to the Section and covering three general areas: (1) Management of forested watersheds for water supply was introduced by Dr. F. Eidmann (Germany) who pointed out to the need of new measurement techniques, exchange of information about research methods and instrumentation. The discussion papers were presented by H. Holstener-Jørgensen (Denmark) who spoke about forest watershed management and water supply and by Dr. R. Dils (USA) who spoke about the future of water resources in the United States. A report from the Romanian Forest Research Institute was read since no one from the Station arrived to the Congress; (2) The role of forests and engineering structures in flood and erosion control was highlighted by Dr. R. Bailey (USA) and Professor S. Ogihara (Japan). The authors noted that biological and engineering means were complementary and essential for flood and erosion control. J. Morris (New Zealand) presented a discussion paper on the conditions of erosion in his country; (3) Shelterbelts: the theme was introduced by Dr. W.Nägeli (Switzerland). In the absence of B. Ničota (Yugoslavia) who submitted two papers, one of his papers about the results of his research was read in the Section. Two discussion papers were presented by R. Baltaxe (UK) on the vertical profile of wind speed near the ground as a criterion of turbulence in relation to shelter, and Dr. M. Prevosto (Italy) with his co-author spoke about an experimental study to assess the relationship between the poplar crown and agricultural crop.

"After considerable discussion, it was decided to establish three working parties: one for shelterbelts, another for avalanches and torrent control, and the third one for methods and instrumentation for watershed management research. Professor A. Weber (Austria) was invited to serve as chairman of the committee on avalanche and torrent control and kindly agreed to do so. The other chairmen and members will be selected at a later date. Part of this new activity reflects the action of the Permanent Committee in changing the name of the Section to Forest Influences and Watershed Management and broadening the subject matter to be considered" (IUFRO 1961a, p. 142).

Section 21 *Research on site factors* (Leader: Professor A. De Philippis, Italy) held five sessions to discuss over 30 papers, covering the following aspects: (1) forest typology and cartography (Aichinger, Austria, E.V. Bakuzis, USA, F.K. Hartmann, Germany, J.K. Jackson, Sudan, H. Jelem, Austria, A. Galoux, Belgium and others). Professor L. Mrozkiewicz (Poland) presented the so-called Warsaw group[159]; (2) climate, ecology (T. Bunusevac and B. Kolic, Jugoslavia, W.A. Fairbairn, UK, I. Gindel, Israel, D.W. Muelder and R. Schaefer, USA) and soil science

[159] See, e.g., the resolution of the IUFRO Congress of 1956 and follow-up activities, related comparison of forest typology systems (De Phillipis 1967).

(M.S. Szarnowski, Poland); (3) assessment of the site conditions as a basis for forest management (M. Bonneau and Ph. Duchaufour, France – 2 papers, F.K. Hartmann, Germany, G. Forget and G. Manil, Belgium, F. Richard, Switzerland, P.J. Viro, Finland and others); (4) biological and ecological factors of forest regeneration (D.W. Muelder and J.H. Hansen, USA) and mutual influence of plants, including root system studies (S. Uemura, Japan – 2 papers, and F.W. Woods, USA). Each group made a proposal to increase the number of members and develop plans for future work.

At a joint meeting with Section 25 on climatic influences, it was proposed to "create a joint Working Group for studying the criteria of assessing the site quality as well as relationships between environment factors and potential productivity of the site. The task of constituting this Working Group was assigned to the Leaders of Sections 21, 23 and 25, who, too, will be thoroughly exploring the question as to how financial aid may be obtained from the F.A.O." (IUFRO 1961a, p.142).

Section 22 *Study of forest plants* (Leader: C.Syrach-Larsen, Denmark) was one of the largest – 44 delegates participated and discussed 22 papers, addressing the following themes: (1) The Leader of the Section read the paper, submitted by O. Langlet (Sweden) to describe the activities of the Committee on Provenance Research, established in Prague in 1959. On the basis of the report, the Section decided to create a Working Group on Provenance Research and Testing under the chairmanship of Dr. M. Vyskot (Czechoslovakia); (2) O. Langlet proposed to make measurements in the existing international provenance testing stand in 1962 when the stand reached the age of 25 years; (3) Upon discussion, it was decided that J.D. Matthews (UK) would be the new Leader of the Section; (4) Plant physiology was discussed, Professor A. Gustafsson (Sweden) expressed and Professors T.T. Kozlowski and P. Kramer (both of the United States) supported the opinion that there was a need to articulate objectives of Section 22 more precisely, adding that it should include both forest genetics and physiology of trees; (5) It was agreed that Professor A. Gustavson would represent Section 22 at the FAO meeting on tree improvement.

Other papers, presented at the meeting of this Section, were related to observations of genetic photoperiodic responses of Norway spruce (Dr. K. Holzer, Austria), variation in progenies of *Quercus imbricaria* – a paper of the Forest Research Institute in Bucharest, Romania (Professor F. Mergen, USA), characteristics of shoot growth (Professor T. Kozlovski, USA), morphological variation in *Pinus nigra* (Dr. P. Bouvarel, France), production of seeds by forest trees (J.D. Matthews, UK, A. Ishizaki, Japan), improvement of trees (I.J. Thulin, New Zealand), improvement of pines through hybridization and especially mass production of the "Pitch-Loblolly pine hybrid" (Dr. S.K. Hyun, South Korea), possibilities of introduction of Mexican pine in the Mediterranean Region (R. Morandini, Italy), etc.

Section 23 *Silviculture* (Leader: Professor H. Leibundgut, Switzerland) held 5 sessions where more than 20 out of the 30 reports, submitted to the Congress, were read (IUFRO 1961b). In particular, they discussed:

(1) Experience with the new classification of trees proposed by IUFRO;

(2) Experience with inscriptions to describe stands, proposed by Professor P. Silvy-Leligois (France). In view of the insufficiency of the available data, it was decided to collect additional data (results) to be delivered directly to Professor Silvy-Leligois;

(3) Determination of the quality characteristics of standing trees. It was recommended that "suitable methods should be further developed and investigated. Above all, those characteristics which played an important role in quality assessment should be determined. Methods to be developed should ensure: (1) that comparable results be supplied. (2) that the results be suitable for a statistical analysis. It was decided against the establishment of a work group at that point; rather, all members should be advised to focus on this problem" (IUFRO 1961a, p. 145);

(4) Effect of silvicultural measures. The report prepared by a group of scientists under the leadership of Professor M. van Miegroet (Belgium) was actively discussed by the Section. Although the results were considered successful, further results should be gathered;

(5) Silvicultural problems, arising from the difficulty of marketing small-sized timber. After his speech, Professor Hellinga proposed to establish a working group for cooperation with other Sections. It was decided to establish a Working Group, which would take into account "the necessary lateral contacts with other sections. The Committee was to consist of research workers from: (a) Northern Lands and Coniferous Forest Areas…, (b) West and Central European Deciduous Forest Area…, (c) The Mediterranean" (IUFRO 1961a, p. 145);

(6) Tropical silviculture was discussed in the report of Dr. A.L. Griffith (East Africa) as the leader of the corresponding Working Group, who pointed to the need to enhance attention to forest and wildlife problems, and concluded that "wildlife management influenced silviculture so strongly, that this problem should not be considered separately from silviculture" (ibid., p. 146);

(7) As a result of the discussion about soil improvement and weed control in forest nurseries, mechanisation of operations in forest nurseries and afforestation, three subgroups were established to address: weed control (G.D. Holmes, Great Britain; P. Arbonnier, France; Professor Chr. Moulopoulos, Greece); fertilization (Professors S.O. Heiberg and E.L. Stone, USA; C.P. van Goor, Netherlands; M. Bonneau, France); and mechanization (C. Letourneux and P. Turpin, France; R. Karschon, Israel; Dr. S.O. Hagner, Sweden);

(8) Silvicultural technical terms. The speech by Professor A. Bonnemann (Germany) showed that the definition of forest terminology was very time-consuming and extensive task. "The following resolutions were passed: (1) Continuation of the work of the Committee is considered necessary. (2) Submitted Proposal II from Professor Bonnemann is to be used as a basis for future work. Nevertheless, an attempt should be made to see if the number of terms (and also their definition for comparison with other languages) can be reduced. (3) For the first comparison, the following languages should be drawn in: German, English, French, Swedish, Czech (Russian), and Spanish. It is recommended that the members of the Committee check with representatives of other languages in their respective language areas before submitting the proposals. (4) The discussion of the kind and number of terms and their definition in different languages should next be carried out in writing under the written leadership of the Working Group Chairman. It is, however, kept in reserve that the Committee assembles when the work has reached a certain conclusion. At this time, the type of summary and publication should also be cleared up. (5) A close contact is to be maintained with the Section of Terminology. (6) The main emphasis should be laid on the definition of concepts by expressing them in other words" (IUFRO 1961a, p.146-147).

(9) Root formation, root growth, and root competition. "The following research tasks are especially recommended: (1) The influence of environment on the coarse root systems of trees of different ages, especially through the physical and chemical structures of soils having approximately the same thickness. (2) The influence of different soils on the fine root systems, i.e., the absorptive outer root surface, in areas with the same climate. (3) Beginning and course of root growth under different growth conditions. (4) Studies of differences, caused by heredity in fine root structure and in periodicity of root growth. (5) Mutual influence of root structure in pure and mixed stands with and without ground vegetation" (ibid., p.147).

(10) Various other silvicultural problems. "In order to intensify the activity of Section 23, it was decided to set up a regional Working Group for silvicultural problems in North America, under the leadership of Professor Heiberg. On the basis of the experience of this Working Group, other regional committees will be considered later" (ibid., p.147).

Section 24 *Forests protection* (Leader: Professor A. Biraghi, Italy) received 26 papers before the Congress, and discussed the following four major issues within the Working Groups:

WG – 1: Population Dynamics and a meeting on the development of terminology of population dynamics.

WG – 2: Mycorrhiza Research with the issue of yellow mushrooms (P. Mikota, Finland) on the example of the United States.

WG – 3: International Cooperation in Forest Pest and Disease Research discussed at 4 sessions, attended by 30-40 delegates each, including 12 members of the working group. Forest diseases in Asia, Europe and North America: the Working Group unanimously agreed that it was necessary to encourage the preparation of annotated lists of critically dangerous diseases and to develop a list of major pests in all continents. Such inquiries about the local situation with forest diseases or serious situations elsewhere might be sent to relevant organizations for plant quarantine, informing about potential dangers of forest diseases for this and other countries and continents. It stressed the need to intensify research for prevention and control of forest diseases in all continents.

WG – 4: Smoke and Industrial Fume Damage (over 20 delegates attended).

At the final session of the Section, "it was agreed that a new Working group on Fire Control should be established. It was also decided that members should use the International Taxonomy of Fungi, used by Dr. Spaulding in his publications, if necessary alongside with any more recent taxonomy" IUFRO 1961a, p.149). The Section also published additional materials on the topic[160].

Section 25 *Growth and yield and forest management* (Leader: F. Firat, Turkey; Associate: Dr. F.C. Hummel, Great Britain) received some 40 papers and adopted the following resolutions (IUFRO 1961a, p. 149-153).

"Resolutions of the Working Party on the Use of Climatic site indices:

"1. The meeting accepted the conclusions of the Working Party which were as follows: (a) In general, the quality class of individual forest sites cannot be determined accurately enough solely from a climatic index; for some particular sites, however, evidence was presented (Parde), that site quality may be estimated with acceptable accuracy from a climatic index amplified by data for soil fertility. (b) The Paterson Index does not offer a means, of world wide application to practical forestry, for estimating even the average potential production per unit area of climatically homogeneous regions. (c) It is not expected that further research may result in any single index similar to Paterson's, which can be uniformly applied all over the world to all types of forest formation. (d) For restricted regions, however, there are indications that it may be possible to find empirical functions, grounded on physiological principles, which permit of sufficiently accurate correlation between the climatic index and mean potential production of forest areas within those regions (see Carbonnier, Special Report, and Week: "Klimaindex und forstliches Produktionspotential", Forstarchiv 31, 1960, H., p. 101-104).

"2. Upon preparation of this report, the working party fulfilled its task and was dissolved.

"3. The working party should now be replaced by another group which should investigate more fundamental aspects of the problem and also consider soil, site and climate.

"4. In view of the changed emphasis of its work, the new working group will be a joint working group under the leadership of Section 21.

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[160] Internationally dangerous forest tree diseases (1963). Working Group on International Cooperation in Forest Disease Research, Section 24, Forest Protection, International Union of Forest Research Organizations/USDA Forest Service, Miscellaneous publications, № 939, September 1963. – 122 p. [Supplement to Section 24-14, Proceedings of the 13th Congress, International Union of Forest Research Organizations, Vienna 1961].

"5. Professor Dr. J. Week (Germany) will represent Section 25 in the new joint working group.

"Resolutions of Working Party on the Use of Aerial Photographs in Forest Inventories. It was agreed that:

"1. the preliminary report on the use of aerial photographs in forest inventories, prepared by the working party be accepted.

"2. the proposal of the working party to prepare and furnish a revised report to the Leader of Section 25 within 1-2 years be approved. The publication format is to be determined at the time the report is completed.

"3. the working party should be a continuing advisory group to meet needs which no other group meets.

"There is another group concerned with reporting progress in aerial photo interpretation in forestry under Commission VII of the International Society of Photogrammetry (I.S.P.). No significant overlap is anticipated, however, in the functions of the I.U.F.R.O. group and the I.S.P. group because (a) the I.U.F.R.O. group is dealing primarily with research in forestry whereas the other group is not; (b) the I.U.F.R.O. group is closely associated under Section 25 with specialists in statistics and other techniques which generally must be correlated with techniques of aerial photography and photo interpretation in order to produce effective applications in forestry whereas the I.S.P. group is not closely associated with specialists in such other techniques; and (c) one member of the I.U.F.R.O. group – D.A. Boon (Netherlands) – is the chairman of the I.S.P. group and thus can perform an excellent liaison function between the two groups to mutual advantage and without duplication of efforts; and (d) another member of the I.U.F.R.O. group is working with the F.A.O. and thus fortunately can perform excellent liaison also.

"4. the functional scope of the working party be increased so that it may advise I.U.F.R.O. on all matters concerned with aerial photography, photo interpretation and photogrammetry, although the group will remain under Section 25. In recognition of this wider scope in functions, the working party henceforth will be called "Advisory Group on Aerial Photographic Applications in Forestry".

"5. at the discretion of the Advisory Group Chairman, its membership may be increased to provide broader geographic and/or functional representation.

"Resolutions on the Electronic Digital Computer in Forestry. It is recommended that:

"1. the Congress should take note of the important development of electronic digital computers, and their application to problems of forest research.

"2. the member Organisations of the Union should be encouraged to carry out research into the application of these machines to their problems.

"3. a register of existing computer programmes of interest to foresters, and an index of organisations and individuals which are actively using computers, should be maintained by the Advisory Group of Forest Statisticians, and that this group should be asked to consider how this might best be done.

"4. a meeting to discuss the experience gained in the use of computers in forestry research and management should be held at the next Congress of the International Union of Forest Research Organisations, under the auspices of Section 25, but open to the members of all Sections.

"Resolutions of Working Party on the Determination of Increment of Uneven-Aged Tropical Forests.

"The meeting approved the preliminary interim progress report, presented by the Chairman of the Working Party.

"The meeting decided that the working party should continue and that its probable course would be that after about two years, when Dawkins' collection of data is published, these would be considered and conclusions reached on the current position. At this time, the working party would decide what further data are needed and what work should be undertaken to collect these data.

"The meeting noted that owing to the vast areas concerned and the difficulty of their access for parts of the year, low percentage sampling was necessary and frequent visits for periodic measurement were impracticable.

"The meeting noted that individual tree data were essential owing to difficulties of measurement of girth (due to buttressing), of height (due to abnormal crown shape and irregular height growth) and of risks (due to abnormalities, caused by extraneous but often extensive events such as fire, hurricanes, temporary cultivations etc.).

The meeting noted and approved the present preliminary and tentative indications (suggested by Dawkins) that: 1. stands of limited extent and intensive management can be dealt with as in temperate regions. 2. extensive stands still under conversion to management require periodic measurement of individual trees with special attention to precise points of measurement and to spatial distribution of the sample trees and plots for statistical validity. 3. unmanaged stands provide no estimate of the timber increment attainable by management. The value of increment observations is to provide data on the individual behaviour of the desirable species as affected by all measurable variables.

"Resolutions on the Determination of Increment by Increment Borings:

"1. The subject deserves further study by Section 25.

"2. A working party should be created for this purpose consisting of Professor Dr. A. Kurth (Switzerland, Chairman) and having as members those who contributed papers on the subject to the Congress as well as some others to be nominated by Professor Dr. Kurth.

"3. The Research Institutes, represented at this meeting of Section 25, agreed to assist in this work if necessary.

"Advisory Group of Forest Statisticians. Resolutions:

"1. Forest research organisations should obtain assistance of specialists in mathematical statistics in the design and analysis of experiments and other investigations. The advisory group would provide advice as to the organisation and equipment of statistical departments if required.

"2. To derive the full benefits of co-operation with statistical specialists, all research workers should have an understanding of the basic principles involved in the design and analysis of experiments and surveys. To promote this understanding: (a) The Advisory Group should undertake a survey of the content and extent of training in statistical methods provided by forestry universities and training schools and report at the next Congress. (b) The Food and Agriculture Organisation of the United Nations should be asked to promote further International Seminars on the application of statistical methods to problems of forest research and management, on the lines of that held in India in 1955.

"3. In order to encourage wider publication of applications of statistical methods to problems of forest research and management: (a) The Advisory Group should consider how best to organise and maintain a library of case-studies of the application of statistical methods, either as reprints from journals or as specially contributed papers, and distribute these on request. (b) Member organisations and the Advisory Group should co-operate with the United States Forest Service in the collection and distribution of information of value in the planning of forest investigations, through the Handbook of Planning-Factor Data (I.U.F.R.O. 25/6 S 1).

"4. The Advisory Group should be available to give advice, if asked to do so, on specific problems of forest research and management.

"5. Member organisations should promote research in statistical problems of particular importance to forestry such as the treatment of growth curves, the appropriate size and shape of plots in experiments and surveys, the accuracy of common mensurational and enumeration methods.

"6. In order to make possible the fulfilment of the extensive commitments mentioned above, the advisory group of forest statisticians should be strengthened, possibly by the formation of regional sub-groups.

"Working Party on Standardisation of Measurements and on Collection of Information on Instruments Used in Forestry. Resolutions:

"1. It was agreed that the report of the working party on Standardisation of Measurements should be published, with the minor modifications suggested during the meetings of the Section.

"2. The report of the working party on the Collection and Publication of Information on Instruments was accepted, and recommendation made that the testing of instruments and publication of relevant information should proceed as outlined in that report.

"3. As the working party has completed its functions, it was recommended that it should be disbanded; additional work in this subject that may be needed will be dealt with by the sub-group on Thinning which is to be formed in Section 25.

"Thinning. Resolutions:

"It was agreed to co-operate in the formation of a joint working group on thinning with Sections 21, 23, 31 and 32 and that the representative of Section 25 in this group (still to be appointed) should be invited to form a sub-group within Section 25".

New subjects for discussion at the next IUFRO Congress were also suggested that the "possibilities and methodology of using temporary (as opposed to permanent) sample plots for studies of growth and yield should be discussed".

Section 31 *Forest economics* (Leader: Professor J. Speer, Germany) held five sessions, one of which held jointly with Section 32. About 40 to 50 persons from 15 countries discussed 20 papers. The Section came to the following conclusions (IUFRO 1961a, p.153-155):

"1. The Section recommends I.U.F.R.O. to adopt the forest-economic terms, unanimously approved by the Section and established in the report on item no. 2 of the Section's Agenda: "Terminology in Forest Economics". The Section suggests that in future all countries use these terms in accordance with I.U.F.R.O.'s definitions.

"2. The Section recommends I.U.F.R.O. to adopt a proposal, worked out by the Working Group of the Section and unanimously approved by the Section after considerable discussion, as to a scheme of accounts for forest estates. The proposal provides for two alternatives, of which proposal 1 follows the so called process principle, proposal 2 the so called balance principle. Since proposal 1 (process principle) allows to take into account continuously both, the values, appearing in the statement of accounts as well as the changes, occurring in the course of management and separating the non-applicable (neutral) items, the Section gives preference to proposal 1 (process principle) as being the more comprehensive one. The Section recommends the scheme of accounts to be communicated to F.A.O. and published in Unasylva.

"3. The Section noted the endeavours by the Universities of Oxford, Wales and Aberdeen to work out generally valid index numbers for the economic status of forest estates in Great Britain.

"4. The Section learned of a method which allows to assess the optimum amount of investment and to analyse in a simple manner the interrelation between investments. Professor H.K. Seip (Norway) showed in his statement the scheme applied in Norway. The Section recommends that statistics on fixed capital formation in Forestry, as developed by Professor E. Melzer (Germany) should be forwarded to F.A.O. as a working basis.

"5. The Section noted Professor N.K. Hermansen's (Denmark) report on methods of pre-

calculation in forestry. In addition, the Section was introduced by Professor F. Jorgensen (Norway) to a method for determining in a dynamic and individual manner the rate of interest in forest calculations and assessments of values according to the prevailing conditions.

"6. In a joint discussion between Sections 32 and 31 the problem of how to measure labour productivity was considered. It was stated that labour productivity is relevant both to national economy as well as to comparisons of this productivity between forest estates. The Section stresses the need for improving the terminological and statistical conditions for measuring labour productivity both on a national and an international level".

The Section proposed to establish the following additional Working Groups:

WG 1: Forest Accountancy (Chairman: Professor Dr. K. Abetz, Germany) with the task to examine "how changes in growing stock can be taken into account in the simplest and most effective way in profit and loss accounting and the statement of accounts" (ibid., p.154).

WG 2: Utilisation of Management. Plans for economic checking (Chairman: Professor E.Melzer, Germany).

WG 3: Methods and Problems of Forest Cost accounting (Chairman: Professor F. Jorgensen, Norway).

WG 4: Methods of Forecasting Supply and Demand on the Timber Market, with special consideration on the variables appropriate in prognoses (Chairman: Professor V. Holopainen, Finland).

WG 5: Measuring the Labour Productivity, conditions, methods and suggestions for improvement (Chairman: Dr. L. Heikinheimo, Finland), in collaboration with members of Section 32.

WG 6: Influence of Thinning on Forest Management (Chairman: Dr. C. Wiebecke, Germany) in collaboration of members of Sections 23, 25 and 32.

For the next Congress, Professor F. Jorgensen agreed to submit a report on Technique of Enterprise Research and its applicability to forestry.

The Section also recommends that, after the resignation of the Section's Leader, Professor Dr. Speer, the Permanent Committee should appoint Professor H. Hermansen from Denmark, as the new Leader, and Professor H. Tromp, Switzerland, as his deputy.

Section 32 *Operational efficiency* (Leader: Professor U. Sundberg, Sweden) accumulated 20 research papers: the place of operational efficiency in the University courses and curricula (L.R. Seheult, Canada; K. Putkisto, Finland; S. Kato, Japan; U. Sundberg, Sweden)), influence of mechanization on silviculture (H. Steinlin, Germany; I. Samset, Norway; C.R.Silversides, Canada), terminology on work study (J.W.L. Zehetmayr, UK), cable systems use in the mountains (S. Kato, Japan, Forest Research Institute of Romania) and others. The Section came to the following conclusions:

"1. It was decided to continue the work on terminology of work study. Professor L. R. Seheult (Canada) was nominated new member of the study group.

"2. The Section took note of the report on noise and vibration prepared by Dr. G. Kaminsky (Germany) and Dr. N. Lundgren (Sweden). The report should be submitted to the Joint F.A.O./ E.C.E. Committee on Forest Working Techniques which had asked the Section to study this matter. Certain recommendations were included in order to reduce the health risks for the forest workers.

"3. In order to maintain close contact with the Joint F.A.O./E.C.E. Committee on Forest Working Techniques it was suggested that an observer should be invited to take part in such meetings of the section where contacts were considered useful.

"4. Professor Seheult was asked to prepare a report on university training in the field of operational efficiency. The report will be based on the deliberations during this Congress and other documentation to be submitted by section members.

"5. Professor Dr. E.G. Strehlke (Germany) was nominated leader of the work to be carried out within the field of ergonomics in forest work.

"6. The Section has decided to ask the Permanent Committee to appoint a deputy section leader.

"7. The Section took note of the study on felling, jointly carried out by Austrian, German and Swedish institutes under the auspices of I.U.F.R.O. The Section specially thanked the Austrian members for the work and hospitality during this study.

"8. The Section expressed its great interest to participate in the joint work of sections 23, 25, 31 and 32 on the influence of mechanization on silviculture. The nomination of the collaborator from the Section will depend on the new section leader.

"9. Professor Dr. H. Steinlin (Germany) and Professor Dr. K. Putkisto (Finland) were nominated members on the study group on labour productivity, jointly set up by Sections 31 and 32.

"10. D. Rehschuh (Germany) was asked to submit a draft of a handbook dealing with forms, units etc. to be used in the publication of reports.

"11. Professor Dr. F. Hafner (Austria) was asked to keep in contact with the study group on avalanche control set up by Section 11 to ensure that no overlapping of work would occur" (IUFRO 1961a, p.155-156).

Section 41 *Forest products* (Leader: Professor J. Campredon, France) held three sessions and discussed 13 papers according to the work plan, adopted at the last Congress in Oxford in 1956. The major topics were on assessing the wood quality in terms of compression (J.D. Hale and E. Perem, Canada), tension (E. Perem and L.P. Clermon, Canada; E. Sacre et al, Belgium), absorption (P.Roosen, Belgium) and temperature (G. Giordano and P.Curro, Italy; H. Krempl, Austria), as well as non-destructive methods for assessing the quality of wood (H.L. Mitchel et al., USA), trends in the world production of resin of conifers (B. Pejoski, Yugoslavia), etc.

"After a lengthy discussion, it was decided to rename the section responsible for utilization matters and to call it *Forest Products Section* with broad responsibilities. Its immediate fields of interest were agreed as: (a) the properties of wood, (b) reaction of timbers to fire, and (c) sawing and machining of wood" (A.M. 1962).

"This is why Section 41 has considered it necessary to re-examine its general working program and to extend it to the whole range of questions, relating to wood, its properties and uses".

Upon discussion of the proposal on a special ad hoc working group, the Section adopted its resolution which was submitted for review to the Union's steering bodies.

The Section's resolution was summarized as follows:

"As a result of the discussions and considering the general advantages of both scientific and technical nature to be derived from integration of research from production to final utilization of wood products, section 41 concluded that its field of activity should be defined as widely as possible.

"(1) Its title should be as follows: Forest Products, Timber Quality, Mechanical Transformation and Protection; Use of Wood for Construction and Packages; Fibre and Chemical Wood Products.

"(2) A close and efficient liaison should be established and maintained with other organizations, working in the field of Forestry and Forest Products Research.

"(3) As a beginning of its work, the Section will establish three Working Groups: (a) Timber Quality, (b) Performance of Wood under Fire, (c) Sawing&Machining Problems" (IUFRO 1961a, p.157).

Organizational matters

The experience of the recent years was reflected in the IUFRO Statutes, revised and adopted by this Congress. The high quality of the document was achieved owing to the efforts of the team, including IUFRO President MacDonald (Chair), Doctors and Professors Harper, Kreutzinger,

Oudin, Pavari and van Vloten, who participated in the revision of the Statutes. The amendments included (in addition to the Permanent Committee), the creation of an Enlarged Committee (Board), composed of the Leaders of the twelve Research Sections. The Enlarged Committee should coordinate the work of the Sections, uniting about 80 working groups (Speer 1972).

At that time, IUFRO's objectives consisted in the development of international research cooperation to study forests and wood products through looking for mutual understanding and exchange of ideas, as well as through standardization of concepts and methods as appropriate. It could be also achieved, in particular, through cooperative research, periodic conferences and workshops, standardization of nomenclature, updating and improvement of international bibliographies and forest terminology. In addition, IUFRO continued to publish reports on the most significant issues of forest research. The International Council remained the supreme body of IUFRO and had its meetings every 3-5 or more years at the Congresses. Each country delegated one representative to the International Council (Redmond 1964).

Professor V.N. Sukachev represented the USSR in the International Council and Permanent Committee, but did not attend the Congress due to ill health; therefore, Professors I.S. Melekhov and N.P. Anuchin from the USSR participated in the Congress (Мелехов и Чертовской 1961).

The International Council had three meetings: on September 11, 12 and 16, 1961, at the House of Industry. The first session was opened by President James MacDonald. It was attended by 34 members; Dr. A. Métro attended it as an observer from the FAO. The Council Members approved the documents of the 12th Congress at Oxford (1956). The President also said that the UK Forestry Commission had permitted him to use the facilities of his office for the Union's needs, so he decided to do without a Technical Adviser.

During the interval between the Congresses, the Permanent Committee held four meetings: in Germany (1957), Belgium (1958), Poland (1959), and the USA (1960), which were always attended by the FAO representative. The President also noted that since 1956, approximately 25 organizations became new members of the Union and there were 17 new corresponding members. At the same time, 4 member organisations had opted out. On the other hand, F.C. Ford-Robertson emphasized that the membership increase by 60% had occurred spontaneously rather than as a result of planned activities of the Permanent Committee.

From the financial point of view, the amount of the membership fee remained the same at CHF 125, and CHF 25 for Associate Members. In 1960, the Union overran its budget for CHF 700, and the costs of translators and interpreters or the Congress in an amount of 2,500 Austrian schillings would be covered by Austria.

He also thanked Mr. Cormack and Mr. MacGregor for their services, which had provided without remuneration, for their excellent work at the Union auditing, and Mr. L.H. Grinsted of London for his services in keeping accounts of the Union.

At the meeting of the Permanent Committee, Dr. Dürr reported about the proposal of the Austrian Forestry Service to establish an arboretum to commemorate the 13th IUFRO Congress. It was suggested that of the Union's members upon return home would send to the Forest Research Institute in Vienna a small amount of seed of suitable tree species. Each species will be correlated with the country of origin and eventually form the basis of the arboretum to become a living monument to this Congress. After a discussion, the Council supported the proposal[161].

The President presented the draft Statutes, consisting of two parts: the Statutes and the Internal Regulations[162].

[161] The Arboretum was not established because the attention was mostly focused on efficient use of scarce seed resources to grow seedlings for the provenance study.

[162] Since that time, IUFRO has been governed by these two regulatory documents.

With respect to Article 16 of the Statutes, Professor M. Vyskot from Czechoslovakia suggested that the Spanish and Russian languages should be added to English, French and German – the official languages of the Union. Dr. M. Kreutsinger from Poland and the Soviet representative supported this proposal. However, after a discussion, it was decided that the introduction of new languages might create a lot of difficulties, and the proposal was rejected by majority of votes. Then, Dr. Vyskot said that it was necessary to discuss whether it would possible to have two Vice-Presidents because the Congress had shown that the workload for the President with only one Vice-President was overwhelming. It was agreed to postpone the adoption of a decision until after further deliberation.

"The President said that it might be necessary in future to consider a reorganisation of the Union, and he hoped that the new President and Vice President would make this one of their duties. The Council decided to defer a decision on this proposal and agreed that it should be reviewed later in conjunction with a general review of the organisation of the Union. Upon thorough consideration, the Permanent Council approved the Statutes and the Internal Regulations." (IUFRO 1961, p.118).

There was one important feature in the new Statutes: everyone, including members of the Permanent Committee and Section Leaders, could be re-elected for one period only. "That is a good thing, because it ensures the infusion of fresh blood into the Union and will bring fresh minds to bear on its problems." (IUFRO 1961a, p.127).

According to the new Statutes, the Union changed its name from the International Union of Forest Research Organizations to International Union of Forestry Research Organizations. But, "we have no copy of these Statutes, as the IUFRO Secretariat was located at the office of the acting Presidents in those days (1956-1971)." (Schmutzenhofer 2002, p.2).

The Permanent Committee reviewed the *International Code of Nomenclature for Cultivated Plants* and "it was agreed that the Union should support and endorse the international code of nomenclature for cultivated plants." (IUFRO 1961, p. 118).

The President announced that he had received a proposal from Austria to establish a new Section, dealing with forest history. The proposal was discussed by the Committee at its meeting in the USA (1960) and it was recommended to the International Council for adoption. It was decided to name the new Section *History of Forestry* and assign its number 02. The main issues to be covered by this Section were as follows: (I) history of natural forests (without overlapping with Section 23), and (II) history of anthropogenic impact on the forest, including "1. History of the area under forest (i.e., clear-felling with stump uprooting, afforestation, forest area, species of timber, etc.); 2. History of forest utilisation; 3. History of forest management (*sensu lato*) (history of silviculture, forest management (*sensu stricto*) and forest techniques, history of forest districts and stands); 4. History of forest legislation, forest policy and protection against man; 5. History of forest ownership and rights of user; 6. History of forest changes brought about by human influence; 7. History of forest literature: Bibliography; 8. History of individual foresters: Biography; 9. History of forest training and research.

"The tasks of the Section were: A. Compilation and documentation of forest history information (Literature–Archives–Biographies, and other forestry documents) alongside with assistance in establishing national collections, archives and documentation centres. B. Establishment and co-ordination of working methods on forest history, i.e., establishment of procedures and terminology, publication of principles to be followed (in compiling) papers and conducting research in forest history; C. Formulating proposals for assessing the value of the work for forestry practice" (IUFRO 1961a, p.119-120).

The Permanent Committee admitted that the activities of the Union on forest products research were inadequate in many ways. The Committee discussed this issue at its meeting in the

USA (1960) and during this Congress, and came to the conclusion that “more activity should be shown in this field and that forest products should play a more important part in the Union's programme of work. The Section recommended that its field of activities should be defined as widely as possible and that its title should be altered to ‘Forest Products’. It also recommended close and effective liaison with organisations, working in the same field. After consideration, the Council agreed that the work of Section 41 should be extended and made more active and that it should be re-named ‘Forest Products’” (IUFRO 1962, p.121).

In 1957, the FAO Forestry Department asked to relieve it from its duties of Secretariat of the Union. For IUFRO, it could entail additional costs, but the President had received assistance from the Forestry Commission of Great Britain, and it would remove some tensions for the time being. Nevertheless, the Committee should think about the matter, referring to the potential increase in costs in the future as future Presidents might not be in the same position and able to get similar help from the country or institution. The issue of increasing annual contributions received no support and should be left for the time being. As a result of the change in the role of the FAO, “the Union had regained much independence and it was a very great convenience to have the secretariat immediately under the President’s control… Mr. Métro said that F.A.O. was of the opinion that the present situation was satisfactory and that it gave a measure of independence to the two organisations. With the exception of the Secretariat, everything between the Union and F.A.O. remained the same” (IUFRO 1961, p.121).

In February 1958, the FAO offered IUFRO a Specialised Consultative Status. The IUFRO Members were informed about it, and the conditions attached to that offer were published in the IUFRO Annual Report for 1958. The President commended the contributions of Dr. A. Métro and his predecessor, Dr. I.T. Haig for their work under the agreement between the two organizations. The Committee agreed to release the F.A.O. from that obligation and the Council approved the decision. The International Council approved the above mentioned and decisions, recommendations of the Permanent Committee and Sections, and some decisions.

Concerning the research-related recommendations of the 5th World Forestry Congress, held in Seattle (1960), the International Council decided that a world-wide technical conference should be organised by the FAO with support of IUFRO and similar bodies to discuss coordination and promotion of “the development of forest tree improvement techniques, the mass production of improved planting stocks and the adaptation of such techniques and materials to afforestation and regeneration programmes on a scientific and rational economic basis” and that it should be assigned to Section 22 (IUFRO 1961a, p.121). The second recommendation was about the expansion of the research activities on forest typology, and the follow-up actions were assigned to Section 21. At this meeting, Dr. A. Métro also made a special recommendation on “wildlife which, as he said, was of great importance to IUFRO directly. This had also been stressed by Section 23. During the discussion which followed, it was suggested that it might be necessary at some future date for the Union to consider forming a new section on this subject and with this in mind research institutes should be asked to gather material and information so that if a new section was formed in the future, basic information would be available. After further discussion, it was agreed that while it might be necessary at a later date to establish a new section on wildlife, no action should be taken at the present time” (ibid., p.121).

The Council also agreed with the recommended changes in the name of Section 01, which should be called *Bibliography and Terminology* and Section 11 *Forest Influences and Watershed Management*. “It was agreed that titles should not be changed lightly but that fields of activity should be scrutinised by the Permanent Committee to prevent overlapping. The Permanent Committee, in

compliance with the Statutes, should propose changes but these must be approved by the International Council" (ibid., p.122).

In addition, the President informed the International Council that the Permanent Committee had considered the proposal submitted by Austria on the establishment of a special section to deal with protection against avalanches and torrents. The Permanent Committee recognized the importance of the topic and decided that Section 11 should establish three working parties, one of which should deal with torrent and avalanche control. Professor A. Weber (Austria) agreed to chair this working group.

On other matter, on behalf of the FAO Director General, A. Métro asked the Council to consider passing a resolution, concerning the readiness of the Union to participate in the FAO's Freedom from Hunger Campaign as well as the Union's participation in the Consultative Committee on Research, established by the FAO Director-General. "On the Freedom from Hunger Campaign, the Council decided that the President should write to F.A.O., offering assistance to them in this Campaign. On representation on the Consultative Committee, the Council saw no objection in principle to the selection of someone connected with the Union to serve in this capacity" (ibid., 192-3).

The Council elected Professor Julius Speer (1962-1967), University of Munich, Germany, to the office of President and Dr. V.L. Harper, Washington, D.C., USA – Vice-President.

The members of the Permanent Committee were elected: Professors T. Bunusevac (Yugoslavia), A. Horky [163] (Austria), M. Kreutzinger (Poland), E. Holmsgaard (Denmark), J. Campredon (France), A. de Philippis (Italy), Y. Saito (Japan) and N. Anutschin (USSR), and doctors D.R. Redmond (Canada) and H.L. Shirley (USA).

Under the new Statutes, the Permanent Committee was to be composed of twelve members, so two seats were vacant. The Council decided to reserve one seat for representatives of India and one of Latin America, and urged to fill the vacancies as soon as possible. Soon, due to untimely death of Professor A. Horky, three seats became vacant in the Permanent Committee. Some delegates noted that not all of the continents were represented in the Permanent Committee, therefore, the International Council recommended to keep this in mind.

The leaders of the Research Sections were also appointed: 01 – Professor E. Saari (Finland); 11 – H.C. Storey (USA); 21 – Dr. F. Richard (Switzerland); 22 – J.D. Matthews (UK), 23 – Dr. M. van Miegroet (Belgium); 24 – Professor A. Biraghi (Italy); 25 – Professor F. Firat (Turkey); 31 – Dr. N. Hermansen (Denmark); 32 – Professor I. Samset (Norway); 41 – Dr. E. Locke (USA). Professor K. Mantel (Germany) became the first leader of established Section 02: *Forest History*.

Most areas of research were covered with specialized working parties, and some of them were involved in joint projects with the FAO, such as bibliography and forest terminology, forest genetics, protection of forests against pests and diseases, and forest work science (A.M. 1962).

Concerning the place and time of the next Congress, "Professor Mantel, on behalf of the Forestry Research Institute in Germany, invited the Union to hold its next Congress in Germany. The Council thanked Professor Mantel and accepted this invitation, and it was agreed that it should be left to the Permanent Committee to establish contacts with representatives of the host country to arrange the exact date and place of the next Congress. The President said that it should be borne in mind that the next World Forestry Congress would be held in 1965 and this should be taken into consideration when deciding the date of the next Congress. The Council noted the suggestion made by Dr. Griffiths that a future Congress be held outside Europe, and preferably in the sub-tropics or

[163] Dr. Horky, to the great regret of all who knew him, died in the same year 1961 on 27th October. Unfortunately, also that year prematurely passed away Professor I.M.Naumenko (Бугаев и Чернышов 2009), and it was reflected in the materials of the Congress, where both names were given in mourning frame: Horky Anton and Naumenko Ivan (IUFRO 1961a, p.256 and p.353).

tropics. After all the items of business on the agenda had been discussed, Professor Mantel said that he would like to propose that the retiring President and Vice President should be made Honorary Members of the Union at the end of their period of office. This proposal was warmly supported by all the members of the Council and the hope was expressed that both the President and Vice President would be able to enjoy their new position for a long time to come. The President and Vice President thanked the Council for the honour bestowed on them" (IUFRO 1961, p. 124).

The final meeting of the International Council was held in the morning of September 16, 1961, and the Closing Session of the Congress began at 03:00 p.m. in the House of Industry.

The President summed up the Congress, underlined major results such as adoption of the new Statutes and Internal Regulations, establishment of a new Section and re-design of a couple of other sections, he also said that the financial position of the Union was strengthened owing to contributions from organizations which had joined IUFRO, good relations with the FAO continued, and that Germany had invited next Congress in the country.

Resolutions

The Congress did not adopt a formal resolution because individual decisions were taken by the Congress, the International Council, the Permanent Committee, and by the Sections. Nevertheless, a few points were identified by the 13th Congress to make useful contributions:

"1. Extending the application of existing knowledge to underdeveloped countries, to improve forest production and to make the advantages of the protection afforded by forest to soil and water felt in the shortest possible time.

"2. How to coordinate forest research in regions where research institutes are few and far between so that their activities may benefit from and contribute to the economic development of all the countries of the area.

"3. How to relate long-term fundamental research to the work of FAO so as to open up new horizons and create new resources" (A.M. 1962).

Excursions

The program of the in-Congress tours included a visit to the Forest Research Institute at Mariabrunn and Schönbrunn, which was an old, long-established institution that has preserved its first title of the State Forest Experiment Station. The Institute is described in a Russian publication as follows: "It is located in a new building and has several laboratories with modern equipment (forest inventory, forest protection, scientific organization of labour in harvesting, etc.). Well-equipped automated computation office allows handling various digital data very quickly. A large card-index facility is established here to keep records of Austrian forests at the level of a province and the country as a whole. In the library of the Institute, there are about 20,000 books, and magazines from 38 countries, including our *Lesnoy Zhurnal*/Journal of Forestry" (Мелехов и Чертовской 1961, p.171).

During the well-organized post-Congress tours (September 18-29, 1961), their participants could see forests and forest enterprises of Austria. The Congress organizers followed the good tradetions of the early years of the Union: a team, led by Dr. H. Dirnberger, had prepared not only the itineraries for the technical excursions, but also printed reference booklets, describing the sites to be visited, and provided interpreters to translate into the English and French languages. Each booklet contained 160 to 180 pages with texts, tables, diagrams and map of Austria (IUFRO 1961c-e). "About 200 Austrian and foreign experts with accompanying persons attended these trips. Favoured by a constant fair weather condition ("I.U.F.R.O. weather"), the excursions proceeded, according to the statement of the foreign guests, to everybody's fullest satisfaction" (IUFRO 1961a, p.157).

Route 1. Silviculture and Related Disciplines (Leader: G. Eckhart; Assistants: J. Nather and A. Siebeneicher; Translation: Dr. R. Bretterbauer and J.E. Türk - English, O. Hermann – French). September 18-29, 1961. The tour ran through the following places: Vienna - Bruck an der Leitha - Parndorf - Neusiedl - Weiden - Mönchhof - Frauenkirchen - Illmitz - Podersdorf - Neusiedl - Jois - Eisenstadt - Mattersburg - Forchtenstein - Mattesburg - Wiener Neustadt – Vienna (IUFRO 1961c, IUFRO 1961a, p.158).

On September 18, 1961, the group was acquainted with specific problems of forestry in the Pannonian Plain to the east of Lake Neusiedl, pests and diseases control, the National Forest Park Weiden am See and the provincial forest nursery at Weiden, biological drainages, windbreaks, and soda-soils. Each day, the participants went to a new location. On September 19, 1961, they visited the Vienna Woods (Wienerwald) and got acquainted with the forestry and silvicultural practices, yield and forest management, economic issues of farming, administration and management of federal forests in Austria.

In Merkenstein, they were familiarized with some problems of management in beech, oak, Austrian black pine, and mixed stands. The group also visited the Merkenstein training and experimental forest, and were informed about site mapping methods.

On September 20, 1961, the excursion highlighted problems of peasant forests in Styria[164] and farm forests, as well as the work of the forestry extension service in conversion areas. On September 21, 1961, they divided into two groups: one could go to Graz - Wolfsberg - Klagenfurt to learn about assessment of forest areas, their inventory and use as a basis for planning in farm forests, as well as economic analysis of farming forestry in hilly conditions in East Styria. The other sub-group could be introduced into the torrent and avalanche control in the mountains and afforestation and reforestation of riverbeds in areas, threatened with mudslides and avalanches, near the timberline in the Alpine town of Gerlitzen, Carinthia.

On the following days, the participants of this tour got acquainted with the work of the Forestry Department with the biological methods of slope stabilization, i.e., afforestation techniques in the Gallina landslip areas, shelter-belt establishment along roads (the Brenner highway) and other sites (high altitude afforestation in the Zillertal area) and creation of green biological barriers for avalanche control to the north of Innsbruck (Innsbruck Northern Range), and to visit the climate station on Mount Patscherkofel.

The participants also saw the forestry conditions in the Salzkammergut area, mechanization of forest operations and biological reclamation by afforestation of wastelands, windproof zones and areas, damaged by forest pests and diseases in Burgenland, they visited the Federal Forest Rangers' School near Gmunden, an exhibition of felling tools, a forest-owned sawmill and wood-waste utilization. Another practice, demonstrated to them, was the sampling methods, used for timber cruising to estimate growing stock and increment for the Austrian forest inventory of 1961 to 1970.

Route 2. Forest Protection (Leader: Dr. E. Donaubauer; Translation: I. Fritz – English) September 18-29, 1961 (IUFRO 1961d, IUFRO 1961a, p.159).

On September 18, 1961, the participants of this tour got acquainted with the climate, soil and geological conditions and successful reforestation practice in Burgenland, forests near Weiden am See, pests and diseases, mechanization in the forest station and biological drainage.

On September 19-20, 1961, the group saw the results of forest protection research in arid regions; fungous diseases of the cembran pine and forest growth under the influence of haze; the study of smoke damage (sulphur in the atmosphere and absorption of sulphur by spruce needles); soil chemistry studies, etc.

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[164] Steiermark – Federal Land (State, Bundesland) in the southeast of Austria, its capital is Graz.

On the following days, the participants visited a spruce and fir forest and learnt what they meant for reforestation in the highlands; they were informed about forest protection; desiccation of pine needles damaged by white snow blight (*Phacidium infestans*) in East Tyrol, Carinthia and Styria, etc. In addition, they visited the Institute of Soil Science in Imst and its laboratory of soil biology; were acquainted with forest protection in the Kufstein area, in particular, damage, caused by the fir needle lice (*Dreyfusia nusslini*); and were informed about the levels of dust in the air of Eiberg.

The final part of the trip (September 26-29, 1961) was devoted to the history of the state forest schools in Austria with a visit to the Federal Forest Rangers' School Near Gmunden, the participants saw pest damages in the Upper Austria, in particular, caused by the forest spruce gall-louse (*Chermes abietis*) to the north of Gmunden, spread of the lesser spruce sawfly (*Pristiphora abietina*) in the foothills of the Alps, and an outbreak of the false spruce webworm (*Cephalcia abietis*) near Karlsbach.

They visited the biological laboratory of the Austrian Nitrogen Factory, Linz, and its industrial plants as well as several fertilizing experiment plots of the Austrian Nitrogen Works. They also saw pesticides and equipment in operation.

Route 3. Equipment in forestry (Leader: Professor R. Meyr, Translation: U.G. Hueter – French) from September 18-29, 1961 (IUFRO 1961e, IUFRO 1961a, p.159-160).

On Monday, 18 September, this group went in parallel with the other groups of the Route 1. Over the next two days, the participants of Route 3 moved without the daily return to Vienna through the following cities: Vienna - Baden - Vöslau - Merkenstein - Wiener Neustadt - Semmering (dinner and overnight stay); Semmering - Bruck an der Mur – Leoben - Göß - Knittelfeld - Friesach - St. Veit a.d. Glan - Feldkirchen - Ossiach - Bodensdorf (dinner and overnight).

During these days, the delegates got acquainted with the methods and equipment for tree planting and forest cleaning, visited the Federal Training and Experimental Forest of Merkenstein and the Vienna Woods (skidding of timber), general project development of the forest and the forests in the central highlands, the network of forest roads and trails in Austria. In addition, they visited the Franz Mayr-Melnhofs sawmill at Göß, and got acquainted with the Austrian experience of mechanical debarking of beech pulpwood and production of *novopan*[165] at the Novopan Factory.

During the next two days, the group was moving in the direction of Innsbruck. On September 21, at Ossiach, the delegates saw skidding of wood in mountain forests and visited the training centre for forestry workers from the Province of Carinthia and Austria as a whole. On Friday, September 22, on the way to Innsbruck, the participants saw a cable winch for hauling of wood, and talked about forestry and forest industries of the Province at the Economic Chamber of Carinthia, Klagenfurt.

On Saturday, September 23, two choices of excursions were offered: 1) off-road trip from Innsbruck to Lake Gallina and back with visiting the sites of biological green barriers and afforestation technology on the naked landslides in high mountains of Vorarlberg; 2) climatic conditions and use of the cable system in the north of the Patscherkofel Mountains, as well as engineering structures for avalanche control in the mountains to the north of Innsbruck. September 24, 1961, was dedicated to sightseeing in Innsbruck.

During the next day, the group were acquainted with the experience of logging and forest road construction in Alpine Tyrol and examined some forest roads in Austria, traveling through Lofer and Bad Reichenhall[166], which was the shortest way to the ridge of Lofer in Salzburg, where the group stayed for overnight.

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[165] *Novopan* is a medium density particle board, manufactured via flat pressing.

[166] In the territory of the Federal Republic of Germany.

On Tuesday, the route went through Gmunden. The participants visited the forest school and learned about the history of public schools for training forest professionals. On Wednesday, September 27, a hike from Gmunden through Kaarbach to Eisenau was proposed. During this walk, the group could see sites of the research, related to productivity of forest stands, and thinning in spruce forests as conducted by one person, using both manual and chain saw (time and efficiency studies, and occupational physiology tests in one-man thinning operations) as well as packaged wood hauling with long-distance cable cranes in the spurs of the Erlakogel and Zirler mountains at the Federal Forest Service District of Traunstein[167].

On September 28, on the way to Vienna, there was a tour to the veneer and plywood factories at Langenlois and Ebensee. The trip ended on September 29 in Vienna.

This trip was mentioned in articles of the Congress participants from Russia: "Of the nine Lands/Provinces which make up the Federal Republic of Austria, we visited eight: Vienna, Lower Austria, Upper Austria, Burgenland, Styria, Carinthia, Salzburg, and Tyrol. Austrian forestry is based, mostly, on mountain silviculture. We had a chance to get acquainted with coniferous (mainly, spruce) and deciduous (mainly, beech) forests, as well as equipment and technology for silvicultural and harvesting operations; to visit woodworking factories (sawmills, plywood production facilities, etc.), research institutions and forestry schools. During the excursion to the experimental forest of Merkenstein (Lower Austria), our group participated in an international planting of spruce trees; it was attended by representatives of 13 countries, a representative of the Soviet Union was I.S. Melekhov" (Мелехов и Чертовской 1961, p.171). The delegates from the Soviet Union also took part in similar planting of spruce trees in the experimental forest near Gmunden (Васильев 1967).

Soviet/Russian participation

The delegates of the USSR represented many regions of the country: Professors N.P. Anuchin (Moscow Forest Technical Institute and VNIILM), P.V. Vasilyev (Moscow, VNIILM), I.S. Melekhov (Arkhangelsk Institute of Forest and Wood Chemistry of the Academy of Sciences of the USSR), I.M. Naumenko (Voronezh Forest Technical Institute), I.V. Tropin (Moscow, MLTI), A.A. Tsymek (Khabarovsk Forest Research Institute), Doctors N.A. Lazarev (Syktyvkar, Laboratory of Forest and Reforestation, Komi Branch, the Academy of Sciences of the USSR) and V.G. Chertovskoy (Arkhangelsk Institute of Forest and Wood Chemistry), Engineer A. Shvakin (Arkhangelsk).

According to Academician I.S. Melekhov, "the Soviet delegation took an active part in the work of Sections 21, 23, 24, 25, 31 and other sections. The reports, prepared by Professor N.P. Anuchin, Professor P.V. Vasilyev, Professor I.S. Melekhov and I.V. Tropin, were presented at the meetings of the respective sections. In addition, some members of the Soviet delegation (Professor P.V. Vasilyev, Professor I.M. Naumenko, Professor A.A.Tsymek, Professor I.S. Melekhov and others) participated in the discussions of some reports, delivered by representatives of other countries. Professor I.M. Naumenko became a member of the International Commission on forest growth... Professor N.P. Anuchin was included in the Permanent Committee as a representative of our country" (Мелехов и Чертовской 1961, p. 169).

It should be mentioned that in the Congress Proceedings (IUFRO 1961b), four papers of the participants from the USSR were listed under the following Sections: 21 – Academician I.S. Melekhov: Komplex Studium der Natur von Kahlschlagflächen und der sich darauf formierenden Wälder (Comprehensive assessment of clear-cut areas and forests, developing on them); 24 – Professor I. Tropin: Die Kiefernrinden-Wanze–*Aradus cinnamomeus* Panz. – und die Bekämpfungs-maßnahmen gegen ihre Beschädigungen (Pine bark beetle bug – *Aradus*

[167] Traunstein peak, elevation 1691 m above sea level.

cinnamomeus Panz. and measures to prevent damage); 25 – Professor P.V. Vasilyev: Über die Klassifikation der natürlichen ungleichaltrigen Bestände (Classification of natural forest stands); Professor N.P. Anuchin: Die effektive und potentielle Produktivität der Wälder (Actual and potential productivity of forests).

The Congress Report contained a special remark, made by the IUFRO President concerning the election of Professor N.P. Anutchin: "To the new post, i.e., the new membership which has followed the adoption of a new constitution, the Council has elected Professor Anutschin of the Soviet Union. So that gives us twelve Committee members, and I think, looked at any way you like, they are a strong group" (IUFRO 1961a, p.129).

Among the foreign participants of the Congress, the name of Professor Vladimir S. Tregubov (1904-1974) should be singled out; he was a member of the delegation from Yugoslavia. V.S. Tregubov was born in St. Petersburg. After his family's emigration from Russia, he graduated from the Higher School of Agriculture at Wageningen (Netherlands), and the National Forest School at Nancy (France) where in 1934, he received a Bachelor of Forestry degree, and in 1941, in Montpellier (France), he defended his Ph.D. thesis. In 1958-1960, as a permanent expert of the FAO, he worked in Iran. After returning to Yugoslavia, he worked as a senior research fellow at the Institute of Biology of the Slovenian Academy of Sciences and Arts (SASA). During this IUFRO Congress (1961)[168], he delivered a paper about silvicultural activities in the mountain forests in the Iranian part of the Caspian Sea (Umwandlung der Wälder der Berg- und Hügelstufen am Kaspischen Meer in Iran durch waldbauliche Behandlungen) at a meeting of Section 23. Formally being a member of the Yugoslav delegation, he worked for the years in the United Nations Programme in Tehran (Iran) where he founded and headed the Department of Forestry. After return to Yugoslavia in 1970, he retired in 1971. In 1974, he died and was buried in Ljubljana.

Another former citizen of the Russian Empire was Alexander Koroleff, Canada, who had earlier participated in the IUFRO Congress of 1953, made a presentation on collective work appraisal of machinery aggregates at a meeting of Section 31 at this Congress.

Interesting facts

At the Congress in Vienna, the first IUFRO logo was placed on the cover page of the Congress Proceedings: it portrayed the globe with an image of the continents around the Atlantic Ocean, framed with the letters "I.U.F.R.O", an oak leaf and a conifer twig. The logo is a symbol of the first step to the global representation of IUFRO in the world, although the majority of countries and member-organizations of the Union of that time were concentrated in Europe and North America. "There is no evidence of who created the logo and who decided on it. Neither the Report of the 13th IUFRO Congress, including the Minutes of the meeting of the International Council, nor the report of the IUFRO President, Honorary Member James MacDonald from Oxford, U.K., provided any information about that" (Schmutzenhofer 2002, p.2).

All documents of the period of 1956-1971 failed to reach the IUFRO Secretariat as it was located in the office of the Presidents, so "for the first time, the IUFRO logo appeared in 1961 under President Julius Speer... Starting from 1965, the logo regularly appeared on IUFRO's Annual Reports in harmony with the change of layout. This first logo appeared most often in IUFRO publications of 1967, the year when the 14th IUFRO Congress was held in Munich, Germany" (ibid., p.2).

Later, a small monument to this logo was set in the forest park in commemoration of the IUFRO Permanent and Enlarged Committees' meeting of July 13, 1968 at Olomučany (Czech Republic). In fact, this monument became the last official use of the IUFRO logo. Entwined with

[168] Professor V.S. Tregubov also participated in the IUFRO Congress in Germany (1967) and made a presentation there.

ivy, this monument is made in the form of a stone pyramid with three signs, “which also shows the names of the Board Members of the time - names which will always be remembered in forest science - will remain as a testimony of IUFRO’s history” (Schmutzenhofer 2002, p.2-3). Years pass, but the sign remains a popular historical monument, often visited by participants of events, held in the Czech Republic under the auspices of IUFRO.

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The Union managed to recover after the devastating Second World War rather quickly. In 1947, at a conference in Helsinki, delegates from England, Italy, Switzerland, Finland and Sweden decided to convene the Congress no later than in 1949. In the autumn of 1947, Finland was still thinking about the organization of the 10th IUFRO Congress in that year, but the FAO kindly asked the Government of Finland to host the World Forestry Congress in 1949. At the end of 1947, Finland decided to accept the FAO’s request and, therefore, refused the request of IUFRO to host its Congress (IUFRO 1948). The Union had to change the original decision on the venue and time of the Congress. The IUFRO Congress had to be postponed till a later date, as it had been decided to hold the World Forestry Congress under the auspices of the FAO in Finland in 1949.

At that time, the position of the Union was very difficult. After the War, the newly established UN Food and Agriculture Organization (FAO) rapidly absorbed several international forestry organizations and there was a strong interest to do the same with IUFRO. In this context, the conference of the Union’s delegates, led by Professor Eric Lönnroth, was summoned in Helsinki in 1947, and strongly rejected the proposal to merge. It was accounted for by the fact that IUFRO, being a purely scientific association, could not become integrated with a political organization, because it was deemed contrary to the mission of the Union. The idea of any direct control by the central organization over autonomous research institutions was also rejected by many countries, whose organizations were IUFRO members. These events predetermined subsequent actions of the Union.

In the preface to the proceedings of the 10th IUFRO Congress, representatives of the Congress Organizing Committee mentioned that under the circumstances, Professor Lönnroth, being the Chairman of the Union, had asked Switzerland to help in organizing the Congress in 1948 and host it. Time was short, and, of course, it was not easy to collect the necessary funds, especially as the Union’s budget for 1948 had been already adopted and approved (IUFRO 1948). As a result, Switzerland was chosen to be the venue for the IUFRO Congress as a neutral country, conveniently located in the centre of Europe (Speer 1972).

It should be emphasized that the tension between the FAO and IUFRO, fortunately, was resolved through negotiations and owing to the perseverance of IUFRO President Professor Eric Lönnroth. In the relationship between the two organizations, common sense prevailed and as a result of negotiations, they signed an agreement. The Agreement was a guarantee of IUFRO’s independence. The FAO also offered its services as the IUFRO Secretariat in Rome; the Union, in turn, promised to assist the FAO in addressing various issues and expressed readiness to invite the FAO’s representatives to all meetings as observers.

At the end of 1948, the IUFRO Secretariat moved from Stockholm to Rome to be based in the FAO headquarters. However, at the end of 1956, the FAO asked to be relieved it from its obligation to support IUFRO activities in this way and received its consent. In 1957-1972, IUFRO had no Secretariat at all, and the work was undertaken by staff of the resident office of the current IUFRO President (Schmutzenhofer 1996a).

In 1958, the FAO gave IUFRO the status of its technical adviser. In subsequent years, the relationship between the two organizations improved, and their relations became closer and more

cooperative. The FAO provided funding for research activities, implemented by IUFRO member organizations, and IUFRO provided advisory services and implemented numerous research projects for the FAO (Speer 1972).

This period of IUFRO's development was marked with major changes. After the bloody and destructive war, the states, people, foresters from different countries found the strength to rebuild the war-torn communications. IUFRO got a new breath, having regained its position in the global "table of ranks", especially in the long and unpredictable first fight for its independence. After the creation of the UN and its agencies, IUFRO's active position enabled it to acquire such new partners as the FAO and UNESCO, as well as to restore and strengthen relationships with partner organizations, which had collaborated with IUFRO for a long time.

During this period, IUFRO underwent two major reorganisations, which resulted into: the adoption of new Statutes of the Union and the Internal Regulations; establishment of the Enlarged Committee; introduction of the Vice-President position; and creation of the Secretariat of the organization. With the adoption of the new structure and the Statutes, the life of IUFRO drastically changed. It entered the period of 'accumulation of forces', expansion of its presence in new regions, new approaches to forest research and its place in the changing world. From the "club" nature of the relationship, IUFRO switched to business, pragmatic cooperation, heading to the future. IUFRO became a global organization, which was reflected in its emblem.

Scientists and foresters of the USSR and Russia were gradually returning to the international life. From 1948 to 1961, the number of participants in the IUFRO Congresses was steadily increasing with growing recognition of the role of forest and science in the global process. The same was true about our prominent scientists: first of all, Academician V.N. Sukachev, who founded the Institute of Forest which became the first Soviet IUFRO member organization in 1947; as well as Professors I.S. Melekhov and N.P. Anuchin who were elected Members of the governing bodies of the Union.

Considering the achievements of forest science, experimental work and practice in Russia, it is necessary to emphasize one important peculiarity: our foresters actively and enthusiastically studied the forests, silviculture and forestry practices instead of confining to a contemplative and 'desk' approach. It was a good rule in the country's forestry since long ago. Another good rule was to ensure applicability of research outputs (which sometimes consisted of much theorized results) for addressing practical issues. Another thing is that the enabling conditions to adhere to such rules were not always existent, it was not always possible to participate in international events, it was not always that scientists had access to latest developments and publications of their peers from other countries because personal and institutional contacts were interrupted virtually for decades. Nevertheless, Russian forest science lived and developed, and, where possible, shared its unique scientific and practical achievements with the world.

Part Five
Expanding Geography of the Union (1962-1981)

Chapter 19
Congress XIV - September 3-10, 1967, Munich, Germany

This Chapter draws mostly from the Proceedings of the 14th IUFRO Congress (IUFRO 1967c), and papers of the Research Sections in nine volumes (IUFRO 1967b).

Overview

It was the fourth IUFRO Congress, hosted by Germany, in IUFRO's history or during the 61 years since the Congress at Württemberg.

As of the end of August 1967, IUFRO had 176 member organizations, 5 associate, 12 corresponding and 2 honorary members. The Congress was attended by 872 delegates (968 people, taking into account the guests and family members) from 54 countries[169] and the FAO, which was a big surprise for the Congress organizers as it was almost four times more than in Oxford, and three times more than in Vienna (IUFRO 1967b, pp. 279, 365-402). The largest delegation was that of Germany: 171 people (West Germany – 168 and East Germany – 3 people), big delegations were also sent by the USA (82 people), and Sweden (57). More than 30 participants came from Finland (47 people), France (44), Great Britain (43), Norway (40), Canada (37), Austria (36) and Italy (31). Turkey (24), Switzerland (23), Yugoslavia, the Netherlands (22), Belgium (18), Czechoslovakia (17), Japan, Denmark, Greece (13) and Australia (12) sent more than 10 people. Bulgaria, Venezuela, Iran, Congo, the Soviet Union, Tunisia and Chile sent 3 delegates each; 15 people were from the FAO.

The final agenda included 5 general sessions, 456 presentations, and 10 guided tours out of 17 tours, previously identified in the Invitation and Programme of the Congress: they were general, regional and special tours (IUFRO 1966b, IUFRO 1967a, p. 61).

Scientific program

In addition to the sharp increase in the number of participants, the Congress organizers also faced a great abundance of topics for discussion in comparison with the previous Congresses. Papers, notices and reports about the discussions totaled 5,687 pages (in 9 volumes), in addition to the 402-page Congress Report volume (IUFRO 1967c).

The Opening ceremony took place on September 4, 1967 at 10:00 a.m. in the University of

[169] Including two German states (the FRG and GDR).

Munich. Professor K. Mantel, President of the German Association of Forest Research Organizations, welcomed the Congress. He spoke about the history of IUFRO and presented the agenda of the Congress. In particular, he spoke about the role of German foresters and thinkers such as Carl Gottlieb Grote, Heinrich Cotta and Georg Ludwig Hartig in the development of forest science as well as the Association of German Forest Experiment Stations in the IUFRO establishment.

Then, Dr. Alois Hundhammer, Bavarian State Minister of Food, Agriculture and Forests, declared the Congress opened. He also spoke about the importance of forestry for Bavaria and current forest situation there, in particular, he said: "Forest economy in this country, after having cultivated the forest according to the principles of sustained yield silviculture and biologically sound maximum yield economy for centuries, now is facing an economic crisis. This crisis is induced with stagnation and regression of wood prices, respectively, ever since 1959, and with the simultaneous increase of operating costs. The situation became worse due to this year's disastrous storm, which ruined more than 3 million m^3 of wood in Bavaria alone and 11 million m^3 in the whole Federal Republic. By these disasters, German forestry was disturbed in its hitherto successful economic scheme… We hope that in meeting these silvicultural goals, German forestry, too, will benefit from the knowledge of international forest research" (IUFRO 1967c, pp. 51-52).

Then, the floor was given to Franz Klose, Director, Department of Forest and Timber Economy, Federal Ministry of Food, Agriculture and Forestry. He also pointed to the problems in the forest economy of the country and underlined that "the reasons of this economic recession might be characterized with three key words: price reduction, cost increase and marketing difficulties" (ibid., p.53). He also spoke about the interrelation of forest policies and forests science, he said that forest science included both fundamental and applied research, and forest-deficient countries had established their own forest research institutions and added: "Whilst the interest for forests in industrial countries is decreasing, one can still find other concepts. In agricultural states and in the young nations now entering the light of history, forests are far more positively appreciated. People realize that primary production and its useful application will form the basis of the economic and social structure of nations and will remain so in the future. This is particularly true for primary forest production. Consequently, within the framework of future forest policy scientific research is faced with new tasks when coping with various problems, arising in developing countries. These problems may only be solved by ingenious cooperation among various research fields, as ensured by the International Union of Forest Research Organizations" (ibid., pp.55-56). Finally, he informed the audience about the plan of the Ministry to promote forestry and timber industry research projects within the next 10 years.

Municipal Councillor Dr. W. Veigel, who represented the Mayor of Munich, welcomed the participants and said that the city was one of the biggest Bavarian forest owners, possessing about 4,000 ha of forests, serving almost exclusively for recreation and water protection. He said: "Just how much we care for the forest may be illustrated by the fact that in the last years about 1,200 ha of forest were made available for recreation purposes and this in a region of beautiful landscapes just outside the gates of this city" (IUFRO 1967c, p.58).

Professor Carl Becker, Rector of the Ludwig-Maximilian University of Munich, expressed his pleasure to say that the University had established a Forestry Department in 1878, and in 1881, it had incorporated the Forest Research Station, future IUFRO member. The University employed such outstanding forest specialists as Dr. Endres, the founder of forest policy research unit there, Karl Gayer, Emil Ramann, Robert Hartig and Karl Escherich. He also noted: "Munich, in particular, has been at all times the home of forest meteorology" (ibid., p.59), recalling the names of Ebermayer, Schmauss and Geiger. Finally, he drew attention to the recently established Institute of Timber Research and Techniques under the University.

Professor Julius Speer, IUFRO President, welcomed the delegates and guests. He said: "76 years have passed since the International Union of Forestry Research Organizations constituted itself in 1892 in Eberswalde. Hence, the Union can boast of being one of the oldest international scientific organizations. Its goal was to cultivate personal relations between forest scientists and to promote exchange of ideas between scientists of related fields… Ever from the start, the Union has been a non-governmental, purely private union with freedom of research and free interchange of ideas on its banner… Science is a field beyond all political controversies and borders. More than ever, it depends on close cooperation and is confronted with the problem of how best to share in worldwide work, be it in international research projects or international research institutes. The knowledge of adverse points of views has a special stimulating effect and clearer conceptions of the many problems are the result" (IUFRO 1967c, p. 61-62).

He stated that the Union had become a global organization, uniting 175 members in 60 countries. He also stressed that IUFRO had begun its rise at a fast pace: many countries had been joining the Union, including Hungary and Italy, attending the Congress for the first time in 1893, Russia and Sweden (in 1896[170]), France and Belgium (in 1900), the United States (1906), Great Britain and Portugal (1910). Despite the two World Wars, long intervals between Congresses and many dramatic changes, since its inception, the idea of the organization had not changed, the Statutes of 1929 had been revised only once in 1961, and the annual fees had remained at CHF 120 during almost 40 years.

The President stressed: "With the differentiation in science increasing, the more descriptive methods changed to analytical ones with an attempt to detail causality. Many of these interrelations can only be tackled with methods developed by sciences other than mere forestry, i.e., by statistics, biometrics, biochemistry, physiology, genetics, and others. These facts account for the necessity of making laboratory work in the different research stations more productive and more effective by cooperating with other scientific organization. Therefore, it is one of the main tasks of the Union to facilitate and to render feasible this cooperation in the various fields of applied economic and natural sciences for the benefit of silvicultural research. Most recently new problems have arisen by the fact that timber as a raw material has lost much of its original general significance. True, wood today still is an important raw material for the production of sawn lumber, of pulp, paper, fibreboards/chip boards, and plywood. Its global production amounts to about 2 billion cubic m per year, according to more recent estimates. But the economic yield is not very satisfactory, particularly so in highly industrialized countries. Forest owners are therefore confronted with difficult economic problems. For these economic aspects, mechanization of forest labour and its rationalization play a decisive role" (IUFRO 1967c, p.63-64).

Finally, he said that the Union from the very beginning had been engaged with special emphasis in the issues of forest influences, especially forest relationship with site, water and wind, forest utilization and refining wood products, asking a rhetoric question "What would timber production be without proper utilization?"

Then, Professor V.L. Harper, IUFRO Vice-President, talked about the scientific organization of IUFRO and work of its Research Sections and Working Groups that had significantly grown in the number and scope of work, and said the Congress participants had much to see and learn in Germany.

Professor J. Campredon, Director, Centre of Forest Technology (Centre Technique du Bois), shared some of his personal memories about IUFRO and the way it had passed in its development, related to wood technology research.

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[170] In the text – 1897 (IUFRO 1967c, p.62).

Professor N.A. Osara, Director, FAO Forestry and Forest Products Division, talked about the situation in forestry research with a focus on the developing countries. “In a progressive world, the role of forestry and wood-based products is also changing, and forest research has correspondingly to switch its emphasis. As a result, new fields of research have to be tackled and priorities reappraised, again and again… In fact … one of the central tasks of IUFRO Congresses is always to analyse the research situation in general and to draw up guidelines for further programs and establish new priorities, against the world background” (1967c, p.69). He stressed the importance of forest land definition for better statistics and other purposes, site capacity and accessibility assessment as a foundation for forestry development, mechanization of laborious jobs, transport economy, wood-based industry development, wood marketing, etc.

In general, he stated: “As the objectives of research have changed, so have also the methods and techniques. Greater emphasis is being given to design in experiments and statistical analysis of results; entirely new fields of science and technology have found their application in forestry research. It is also interesting to note that in many cases there is a switch from a general research program to a project approach. A project approach is based on a clear definition of the purpose and scope of the program, involved and on allocation of the appropriate staff and budget together with a time limit for implementation” (ibid., p.70).

Talking about forestry research and personnel, he identified the trend towards buying facilities and equipment to start a project prior to assuring availability of needed skills. So, training for research staff should be addressed and international cooperation in this area was needed, especially, when developed countries could help developing countries. In addition, he said: “It is necessary to recognize the role forestry can play in economic and social growth in a given country. A national forestry research program should be consistent with the objectives and targets of the overall national development philosophy. Research has to be carried out against this background in each country - a background, which might be very different from the approach research workers of old countries are used to. In order 'to carry out such a balanced program, forestry research institutes could in some cases better be organized as multi-purpose forestry, development institutes where research and implementation go hand in hand” (ibid., p.71). To this end, IUFRO, FAO and United Nations Development Program (UNDP) should work together and IUFRO and FAO should strengthen their cooperation in forestry research and related fields.

After the welcome addresses, Professor I. Samset, Norwegian Forest Research Institute, Vollebekk, made a plenary presentation, titled: *The general trend of forestry and its challenge to forestry research*. Starting with a reference to the main theme of the 6th World Forestry Congress in Madrid (Unasylva 1966): *The role of forestry in the changing world economy*[171] with its record number of participants (over 2,000), he immersed in the history and went from B.C. periods: via Plato and Cretans to forestry issues of the recent past. He referred to scientists of the 18th century, trying to address forestry issues “von Beckmann (1700-1777) who dealt with silvicultural problems and von Moser (1729-1793) with his basic works in the area of forest economics” (IUFRO 1967c, p.75). Turning to the present, he said that according to the FAO forecast, global consumption of wood would increase to 2.69 billion m^3 by 1975 which was 25% higher than in 1961 (2.13 billion m^3). The greatest reserves of mature and over-mature virgin forests were concentrated in the USSR and Canada, each of them harvested, respectively, only 60% and 45% of potentially available timber. Among the major common scientific and practical problems of modern forestry, he named “1 - The development of methods for increased planting programmes. 2 - The development of methods for thinning operations and harvesting methods for small-sized wood. 3 - Silvicultural means for

[171] Based on a FAO-commissioned study: *Wood: World trends and prospects* (1966).

increased fibre production at acceptable cost. 4 - The development of logging and transport methods to achieve economical accessibility of remote areas and difficult mountainous terrain. 5 - The development of wood processing industries, enabling them to process more tree species as well as a continuous mixture of tree species. The potential of world forests was large enough to meet the increased requirements to wood if professionals and scientists could find a way to solve the existing problems. This is primarily an undertaking for forestry research organizations of the world" (IUFRO 1967c, p.76).

He also mentioned a number of research achievements in the forest sector and summarized typical trends in the application of these results as follows: "1 - A close coordination between the forest production and wood processing industries. 2 - The integration among various types of processing industries. 3 - New processing methods which allow high production with smaller equipment. The introduction of axial or spiral chippers is a typical example. They can square logs for lumber during the production of chips from the slabs, and thus give good possibilities for the integration between sawmilling and pulping... The production of mechanical pulp from chips is another revolutionary development… The introduction of continuous digesters in the production of craft pulp of high quality instead of the conventional processing method on a batch basis should certainly be mentioned in this connection" (ibid., p.78-79).

The speaker also reminded that there were examples of continued use of labour-consuming methods, requiring about 5 man-days per cubic meter, and labour-intensive harvesting methods on top of which was advanced completely mechanized felling methods, taking less than 0.1 man-day per cubic meter.

He reminded that since the invention of the motor-chain saw in 1858, profound changes had occurred, the production cycle was, now, based on sophisticated machines, and forest workers had been replaced by machine operators. Nevertheless, industrial outputs continued to fall against the background of increasing wages of workers in the forest sector, although the level of prices and wages depended on many factors and varied by region. For instance, the wage of a forestry worker in 1965 was half a dollar per day in Uganda, $1 in India, $2 in Greece, $ 11 in Scandinavia, and $ 20 per day in Eastern Canada. A common tendency for all countries was that costs of manual labour were growing faster than costs of machine work.

The speaker also described the ongoing evolution of a working method (mechanization of forestry operations): "It is rather human that we try to keep traditional methods as long as possible until the price pressure of forest operations makes it necessary to change into better methods. This evolution is like a law of conformity. Let us call it the law of discontinuous evolution. Accordingly, the development from one operational method to another can be assumed to progress in four stages. During the economic pressure stage, the cost of using the traditional working method is growing too high. During the development stage, new methods are tested through experimentation. During the introduction stage, the new method is introduced on the market. During the stabilization stage, the new operational methods are coordinated with all other activities and needs of forestry" (IUFRO 1967c, p.82-81). This evolution was described in Scandinavia and Eastern Canada, and became one of the general trends in forestry.

In conclusion, he referred to an analysis of investment into forest research, with such investment accounting for about 0.5% in the final product value versus the investment of 3-5% of the product value in research and development in chemical and metallurgy industries. The speaker expressed the hope that the future would see sufficient resources, allocated for forestry research to achieve its objectives.

The Research Sections and Working Groups (WG) met on September 4-8, 1967.

Section 01 *Bibliography and Terminology* (Leader: Professor E. Saari, Finland) held four

sessions, and their results were summarized in the report of the Section. In 1967, the Joint Committee for Bibliography and Terminology, headed by Professor E. Saari, *inter alia*, included representatives of the four language groups – German (W. Liese, Hamburg), French (A. Métro, Paris), English (P.G. Beak, Oxford) and Spanish (V. Garcia Perez, Madrid), although the latter was not an officially recognized language of IUFRO yet. It was noted that in addition to the previously published volumes of the Oxford System of Decimal Classification of Forestry (ODC) in German, French and English, the ODC was also published in the Italian (1962), Portuguese (1964) and Swedish (1966) languages, during the period between the Congresses.

To prepare the Multilingual Forestry Terminology, the Forestry Terminology Project team was established in 1964 and managed by the Society of American Foresters (SAF) in cooperation with the Committee. By March 1967, 1,263 cards were issued and 1,500 definitions in English were in prepared. The purpose of the project was to include 5,000 terms and definitions. To undertake this work, language groups were organized, additional funding was raised, several national and country groups were established, and several working parties on terminology were set up under the IUFRO Research Sections.

The World List of Periodicals and Serials of Interest to Forestry was prepared with significant inputs from the FAO (compilation, publication and dissemination). The complete version of the List was first circulated in 1966. In addition, IUFRO continued publishing international glossaries, dictionaries and terminologies. In particular, the Glossary of Terms for Work Study in Forestry was prepared by IUFRO Section 32 under the guidance of Professor U. Sundberg from Sweden.

Among papers, read at the sessions, there was an interesting study on bibliography of forestry literature on aerial photography (G. Hildebrandt, Germany).

Section 02 *History of Forestry* (Leader: Professor K. Mantel, Germany) held three sessions during the Congress, attended by many members and delegates from Austria, Czechoslovakia, England, Finland, the Federal Republic of Germany, France, Hungary, Italy, Norway, Switzerland, Turkey, and Yugoslavia.

In his report, the Chairman noted the growing willingness to study forest history in various countries, especially in Austria, Denmark, Germany, Finland, Norway, France, Sweden and others. At the previous IUFRO Congress in Vienna, it triggered the decision to establish a new Research Section, and the International Council appointed Professor K. Mantel the first Leader of this Section.

The first, inaugurating meeting of Section 02: *Forest History* was held in October 1963 in Freiburg, Germany. Representatives of Belgium, Finland, France, Germany, India, Iraq, Italy, Liberia, Netherlands, Norway, Turkey, Sweden and Switzerland, and the USA attended the meeting. They discussed the ongoing and planned studies in various countries on the history of forest institutions and forests. It was recognized that the successful work of the Section was possible only on the basis of common terminology and definitions, so it was necessary to develop a common classification system for forest history. Therefore, there was a need for close cooperation with Section 01 to develop a uniform classification and systematics with a focus on particularly difficult areas to develop uniform terminology. During the discussion of the goals and objectives of forest history, the need to document historical information and documents on forestry and forests was stressed.

To this end, the Forest History Institute, University of Freiburg, was selected to be an international centre for storage and research of historical documentation. The discussions resulted into the following five recommendations in respect to 1) history of forestry in different countries; 2) classification and terminology of forest history; 3) forestry historical documentation; 4) history of national and regional forest inventory, and 5) tasks of the Section.

The next meeting of the Section was held in August 1965 in Vienna, it was dedicated to the 12th International Congress of Historical Sciences, the First Congress was convened in 1900 (Кулаковский 1903). The IUFRO Section meeting was focused on the history of the European

forestry and wood industry, and methodological issues. The resolutions of the Section targeted the development of scientific cooperation in forestry and cooperation with historical research. It was agreed that the IUFRO Section on forest history would cooperate with the economic history group of the International Congress of Historical Sciences.

The Section meeting included a presentation of the book on German forest history (1560-1965), prepared by Professor Kurt von Mantel, with an introduction to the development of forestry literature in Germany from the end of the Middle Ages up to the classical period. Part I was published in 1967; it contains 578 pages and included 8,100 headings and indexes of subjects, sources and geographical names (Mantel 1967). The annotation to the volume said that it was an important and interesting source for collector of forest and hunting literature.

The Section Leader's annual report was followed with a discussion about future work. It was decided to continue the ongoing work. In particular, it was linked with the processing of the second part of the German forest bibliography. It should be published in about a year and would include a description of the development of forestry literature in the past 100 years, the books and writings, corresponding to titles 7 to 9 in the Oxford system and addendum.

It was decided to continue the work continued on the international forestry biography in the index format, and draft guidelines on historical studies at the level of an area and stand.

The Section also considered the possibility to create a WG on the history of the forestry language in view of the importance of etymological and philological studies for forest history.

The discussion resulted into the decision to increase the number of the working groups from 3 to 6 to cover: 1. Silviculture and Forest Management (A. until the 17th century; B. in the 18th and 19th centuries); 2. Forestry Regulations; 3. Mountain Forestry, Timber Export 4. Other Forest Products Use; 5. Forestry Training; 6. Dendrochronology.

Section 02 discussed 19 papers at three meetings.

The WG on Silviculture and Forest Management collected papers about knowledge of ancient times about propagation of trees (O. Makkonen, Finland); emergence of forestry and planting of trees in the Middle Ages in Germany (K. Mantel, Germany); tradition of Hungarian silviculture (P. Csôre, Hungary); afforestation and artificial reforestation in Czechoslovakia in the years 1243-1770 (J. Nožička, Czechoslovakia); cultivation of larch in predominantly swampy forest conditions of Bamberg in Franconia (F. Elsner, Germany); economy and forest culture in western France in the early 18th century (M. Duval, France).

The WG on Forestry Regulations discussed papers about forests of the French Empire under Napoleon I (M. Devèze, France); power and freedom in forest history (H. Rubner, Germany); Spanish forest policy in the 19th century (E. Bauer, Germany), etc.

The WG on Mountain Forestry and Timber Export registered a few papers about: the birth of mountain forestry in Switzerland (A. Hauser, Switzerland); timber exports from the Swiss Alps till in the 1890s (H. Grossmann, Switzerland); etc.

The WG on Other Forest Products Use received papers about an interesting Turkish regulation of 1871 on resin tapping (B. Pejoski, USA) and coppicing and bark extraction in Frankonia in the 18th and 19th centuries (H. Hendinger, Germany).

The WG on Forestry Training discussed a brief historical overview of forestry education in Austria on the example of the Forest Institute and Forestry Academy at Mariabrunn during 1813-1875 (H. Killian, Austria); a paper about the importance of the University of Gissen for silviculture and forestry (H. Boucsein, Germany); a paper about 100 years (1868-1968) of forestry science and education in Hann-Munden (K. Hasel, Germany).

The WG on Dendrochronology discussed an interesting paper about tree-ring and C^{14} dating (B. Huber, Germany).

Section 11 *Forest Influences and Watershed Management* (Leader: G. Storey, USA) decided

at the Congress in Vienna in 1961 to establish the following three Working Groups (WG): 1. Shelterbelt Research, 2. Avalanche and Torrent Control Research, and 3. Watershed Management Research Techniques and Instrumentation. The Section Leader established these WGs shortly after the Congress. The Section consisted of 135 members from 33 countries.

The WG on Shelterbelt Research embarked on a comprehensive review of shelterbelt activities and windbreak planting around the world. But the review was not completed in time due to lack of reports from several regions of the world.

Professor A. Weber (Austria), Chair of the WG on Avalanche and Torrent Control Research, listed the following four research areas of international significance: (1) resistance of artificially afforested slopes to water erosion, (2) torrents in the flysch formation, (3) sill, and (4) debris. It was agreed that further discussions were needed to prioritize activities as well as define whether it was desirable to split this WG into two groups in the future: one on torrent control and another one for avalanche control.

The WG on Watershed Management Research Techniques and Instrumentation reported about the work to produce a directory of active research projects in watershed management. A questionnaire had been prepared and sent to all members of the Section. The directory, covering 105 projects, was compiled and sent to the members of the Section. This handbook included not only information of the project's location, leader and objectives, but also a list of published results. Besides, this WG was working on two bibliographies, related to precipitation interception: (1) on rainfall interception and (2) on snow interception.

Since the previous Congress, one of the major events was the International Symposium on Forest Hydrology (August 29–September 10, 1965, Pennsylvania State University, USA). The symposium was sponsored by IUFRO Section 11 together with the International Association of Scientific Hydrology, North-Eastern Forest Experiment Station (IUFRO member) of the USDA Forest Service, and another IUFRO member – the Pennsylvania State University as the host institute. The US National Science Foundation provided financial support for this event. The symposium gathered over 90 scientists from more than 20 countries and FAO. Members of the Section prepared the agenda of the meeting. The symposium proceedings became the most complete collection of information about forest hydrology and included over 80 papers, covering such aspects as forest hydrology, forests and precipitation, forests and soil water, forests and evapotranspiration, forests and runoff, forests and soil stabilization, and research techniques and instrumentation (International Symposium 1967; IUFRO 1967c, p.173-174).

The efforts of this Section arouse great interest. The Programme of the Congress included 13 technical papers, but in fact, about 18 papers were submitted to cover a wide range of issues, related to the three themes mentioned above. There were papers on microclimate and crop growth as affected by wind shelterbelts (D. Yakobi and Y. Zohar, Israel) and on negative effects of poplar strips on some agricultural crops (E. Castellani and M. Prevosto, Italy), on torrent and avalanche control with the help of dams (G. Kronfellner-Kraus, Austria) and reforestation (H.R. In der Gand, Netherlands). Papers on research methods and techniques were about the thermoelectric method for continuous recording of sap flow in the tree stems (L. Leyton, UK), improved evaluation of the transpiration rate, based on the measurements of thermal pulsation (R.H. Swanson, Canada); study of water quality and streamflow as a characteristic of runoff from watersheds (H.M. Keller, Switzerland; W.E. Sopper and H.W. Lull, and S.J. Ursic and T.W. Popham, USA), hydrological research methods, used in forested peatlands in the USA (R.R. Bay, USA) and in grassland watersheds (E.G. Dunford, USA).

About 30-40 people attended each meeting of the Section. However, according to the Congress documentation, many papers were only read due to the absence of the speakers and it

impaired the discussions which were limited to generalities. Some papers were excluded due to the absence of their authors at the Congress.

In spite of the efforts to encourage cooperation in shelterbelt research, the achievements were modest. The situation was complicated because of parallel activities in this area on the part of the World Meteorological Organization (WMO)[172] which had published a bibliography covering some meteorological aspects of forestry (WMO 1966), as well as those on the part of the UN FAO which had sponsored a study tour for Middle East countries to the Soviet Union[173]. "It was agreed that before any firm decisions could be made as to the future of this working group, further inquiries should be made among member institutes as to the problems encountered, e.g., in establishment, design, prediction of climatic effects, etc.; the main aim would be to define the research, required outside the empirical determination of shelterbelt effects. Other lines of research suggested included the effects of shelterbelts (and forests) on noise, air pollution, and bird life. Useful results might be obtained through cooperation with Section 26 and with F.A.O. and W.M.O." (IUFRO 1967c, p.176).

As for the *WG on Torrent and Avalanche Control*, a study on Austrian watersheds enabled graphical representations to be made of 51 river bed profiles (the report of Professor A. Weber). This work could serve as an example of IUFRO's collective research: it was supplemented by technical data from Czechoslovakia provided by Professor D. Zachar from the Forestry Research Institute in Zvolen. The joint work of Professors Weber and Zachar should continue until 100 profiles had been received, and then the project would be completed.

Another example of cooperation within IUFRO was a study of torrents in Flysh formations. This problem was very important because torrents could not be controlled by traditional means, used on primary or calcareous rocks. Professor Weber had carried out a study with his students in Austria, Germany (Bavaria), Greece, and Yugoslavia. He also propose to launch a joint international study together with Dr. W. Goldschalt (Water Resources Agency, Kempten, Bavaria), P. Margaropoulos (Ministry of Agriculture, Athens), and Professor Rainer (University of Ljubljana) to develop the internationally valid principles.

The Section worked out several recommendations on further work and leaders for specific areas. It was recommended that research on torrent-caused damage should be singled out as a separate project; closer relationship should be established with IUFRO Section 01 to address terminology and bibliography; and torrent and avalanche control and snow protection should addressed jointly with the FAO. "The decision on making a separate working group on avalanche and snow protection, though agreed in principle, was postponed until more is known about what is being done in this field and how many members would be prepared to collaborate" (IUFRO 1967c, p.178).

In the *WG on Watershed Management*, the Section Leader H.C. Ctorey informed that the bibliographies on snow and rainfall interception were almost completed. It was recommended to establish closer cooperation with the international organizations such as FAO, WMO and the International Association of Scientific Hydrology (IASH)[174].

As a general recommendation, the Section proposed the following: "In view of the increasing number of papers submitted to IUFRO meetings, various suggestions were discussed as to how the limited amount of time available for meetings should best be organized. One suggestion was that

[172] The World Meteorological Organization was established in 1873 as the International Meteorological Organization, and changed its name in 1950 after becoming one of the agencies of the United Nations Organizations.

[173] Most likely, it refers to the tour of 1956 under the auspices of the FAO which was mentioned at the Congress in the UK because in 1957-1967 no forest-related trip to the Soviet Union was mentioned in the Yearbook of the United Nations.

[174] The International Association of Scientific Hydrology (IASH) was established in 1922, and after 1971, it changed its name for the International Association of Hydrological Sciences (IAHS).

meetings should be arranged to discuss a limited number of major topics and that for each of these, one or two speakers be invited to present the papers and lead the discussions. No specific decisions were made" (IUFRO 1967c, p.178).

Section 21 *Site Factors* (Leader: Professor F. Richard, Switzerland)[175]. Between the two Congresses, the WG on the influence of non-native tree species on soil properties (Dr. Holstener-Jörgensen, Denmark) had undertaken a survey and reported about its changed structure, goals and objectives, as well as results of the survey of scientists, collaborating in this section. The survey (92 responses) also showed that the majority of scientists knew nothing about the impact of invasive species on the environment (only about 5% of respondents were aware of it). An analysis of the responses revealed the need to study such relationships in more specific terms than it had been done before. Based on the study, the following considerations and recommendations were proposed:

"1. The choice of species must be based on ecological aspects. There should be a good relation between the ecological and physiological properties of a species and the conditions of the site. Criteria for this relationship are growth and permanent health of the stand. Yield and economy considerations can only be applied to stands of species which are ecologically adapted to the site. 2. The possibility that more species do have potentially good growth on a given site in general decreases if only one specific site factor is decisive, e. g.: wet soils, organic soils, sandy dry soils, extreme climatic conditions, etc. 3. It is obvious that every tree species has its specific influence on the site and vice versa. 4. It is obvious that any silvicultural treatment has its influence factors on the site. 5. It is important to be aware of whether the influence induced is temporary or permanent. 6. Within certain limits man can influence site factors in such a way that, e.g., growth and health of a species can be improved or that even more species can have good growth and health. Such means of influence are of biological nature, e.g., mixes of species, thinning, etc., or of technical nature, e.g., drainage, fertilization, soil preparation, etc.

Recommendation: The problem of interrelation between stand and site must be treated in a much more specific scientific way than it has been done so far, to come to general conclusions. An objective consideration of these relations require systematic site research" (IUFRO 1967c, p.180-1).

The *WG on Iternational Comparison of Methods for Forest Site Mapping* (Professor Heinz Ellenberg, Switzerland) announced the publication about the five methods in the IUFRO Annual Report 1964, and by the end of 1967, another article should be published in a special issue of *Veröffentlichungen des Geobotanischen Institutes de ETH, Stiftung Rubel, Zürich* (Publications of Geobotanical Institute, Zurich, Switzerland).

About 22 papers were submitted to four sub-sections, but the IUFRO proceedings included 35 papers (IUFRO 1967b, Vol. II) of which 17 were presented by the authors. The papers addressed forest productivity from a conceptual point of view (S.P. Gessel, USA), depending on site conditions in general (C.O. Tamm et al., Sweden; C.H. Laatsch, Germany), site factors (D.S. Jackson, New Zealand), soil conditions (F.H. Evers, Germany), groundwater (L.W. de Backer and L. Boersma, Belgium), ground cover as an indicator of productivity (D. Kinloch and C.J. Mayhead, UK), etc. Descriptions of site types were contained in the reports, presented by H. Ellenberg, Germany (assessment of key factors for growth conditions, and results of the international comparison of methods for describing forest areas); by I. Babos and D. Kopp, Germany (comparison of habitat and methods, used for vegetation mapping in Hungarian area between the Danube and Tisza River), by T. Satoo, Japan (influence of growth conditions of the Japanese cedar/*Cryptomeria japonica*), by M.R. Gajic (influence of the humus content on the growth of the eastern hornbeam/*Carpinus*

[175] The report of the Section's work was prepared in German (IUFRO 1967c, pp.179-184).

orientalis in some types of forests in Serbia, Yugoslavia), by Z. Jârô (plant diseases due to lack of nutrients) and others.

After discussion, the Section concluded that currently it was not possible to determine the absolute production potential of a site. By contrast, it was possible to estimate a growth rate of a given stock, based on decisive location factors. To improve the work of the Section, seven new working groups were set up.

Section 22 *Study of Forest Plants* (Leader: Professor J.D. Matthews, Great Britain) received 73 papers and held 12 meetings, including four sessions jointly with Section 41: *Forest Products* and one session with Section 24: *Forest Protection*.

This Section coordinated research in tree physiology, genetics and breeding, and the anatomy, morphology and taxonomy of forest plants in temperate, subtropical and tropical regions. After 13th IUFRO Congress, the Section increased the number of its collaborators from 254 to 464 people, represented 204 institutions from 54 countries, including 15 people from Africa, 23 from South-East Asia, and 19 from Central and South America.

Between the two Congresses, representatives of the Section participated in a very important meeting: the World Consultation on Forest Genetics and Tree Improvement (August 23-30, 1963, Stockholm, Sweden). The meeting was organized by FAO in collaboration with IUFRO, and attended by about 168 representatives from 36 countries. In the same year, FAO published the Proceedings of this meeting in two volumes. The members of Section 22 prepared the final report, and it was published in a special issue of Unasylva (1964). The participants made a number of recommendations to the governments for the future development of forest genetics and breeding, and gave specific recommendations to FAO and IUFRO (Unasylva 1970)[176]. In addition, the Section's representatives organized two successful meetings (Zagreb, Yugoslavia, 1965; Budapest, Hungary, 1966).

The *WG on Provenance Research and Testing* was reorganized during the Congress in Vienna. Recommendation # 8 of the World Consultation on Forest Genetics and Tree Improvement, stressed the importance of 1) publishing results from past international provenance tests, 2) establishing new tests, 3) preparing guidelines on collection of seeds, design of experiments and evaluation of results.

As for the guidelines, about 60 members of the Section met on September 6-11, 1965 at Pont-à-Mousson (near Nancy, France). They drafted the Scheme for Standard Methods of Provenance Research and Testing. Members of Section 22 discussed the guidelines before and during the Congress at the Section's meeting on September 8, 1967. It was decided that after adoption, the text should be translated into French and German and published.

Following the World Consultation on Forest Genetics and Tree Improvement, IUFRO established its WG on Plant Physiology, the program of which was discussed at the Congress in Munich. During the discussion, the need to establish two WGs (on Physiology of Sexual and Asexual Reproduction and on Physiology of Growth) was revealed. Another newly established WG on Quantitative Genetics had to work on theoretical foundations of origin and explore genecology, applied to forest trees.

Representatives of Section 22 participated in the meeting at Pont-à-Mousson and Zagreb, stressed the need for establishing a new WG on International Testing of Clones, used in forest tree breeding, as well as developing standard procedures. This WG was established during the Congress.

Representatives of the Section participated in the meeting: *An Advanced Study Institute on*

[176] Unasylva (1970) Appendix 3. Annotated recommendations of the first consultation on genetics and tree improvement (Stockholm, 1963) // Unasylva, 1970, Vol. 24 (2-3), №97-98 http://www.fao.org/3/a-a2173e/a2173e0i.htm

Genetic Improvement for Disease and Insect Resistance of Forest Trees, held at the Pennsylvania State University in September 1964. One of the resolutions of the meeting was to establish a joint WG on Genetic Resistance to Forest Diseases and Insects. This WG, uniting IUFRO Sections 22 and 24, should promote cooperation and exchange of information among scientists and specialists in the field of genetics, physiology, forest pathology and entomology, dealing with tree species, genetically resistant to insects and diseases.

The *WG on Terminology and Classification of Information* was formed to cooperate with IUFRO Section 01 in the field of "unification of the terminology, used in forest genetics, tree physiology and related fields of research" (IUFRO 1967c, p.189) in response to the need to revise the ODC parts, related to the scope of Section 22.

The *WG on Procurement of Seed for Provenance Tests* concentrated on obtaining seeds from Western North America for provenance research. The efforts were rewarded in 1966, and seeds from a very wide range of sources became available.

The *WG on International Trading in Tree Seeds and Plants* played an active role in developing the Scheme for Control of Forest Reproductive Material Moving in International Trade. The Organisation for Economic Cooperation and Development (OECD) [177] sponsored the Scheme and financially supported a few meetings of forest tree seed experts in Paris (France) and one in Cambridge (UK). The scheme was approved by the OECD Council for Agriculture and sent to the OECD member countries for approval and further implementation.

After the Congress in Vienna, the delivery of seeds reached a qualitatively new level, primarily owing to the high interest in many parts of the world to the results of provenance research. A few examples of global interest to improve the genetic quality of seeds, used in reforestation and afforestation, were: the establishment of the International Centre for the Study of Mexican Conifers; the visit of the Scandinavian Study Group of Norway spruce (*Picea abies*) to Romania in 1962; the new International Norway Spruce Provenance Tests, proposed in 1964 by B. Vins (Czechoslovakia); the collection of 1,400 Norwegian spruce of different provenances, grown up and disseminated by Professor O. Langlet (Sweden); and the Eucalyptus seed bank, established by the Forest Research Institute (Canberra, Australia).

In 1961-1967, the Section Leader disseminated nine circular letters.

Section 22 recommended the Congress to publish the Scheme for the Design and Analysis of International Provenance Research and Testing in IUFRO bulletin in 1968. Key discussions in the WGs included: genetic resistance to insects and diseases (9 papers), spiral grain and patchiness (8), plant physiology, (16) heartwood formation (5), theoretical aspects of provenance research (30 papers), methods of international provenance research and seed testing (4), methods of selection (1 paper), etc. At the joint meeting of Sections 22 and 41, about 10 papers were presented.

Section 23 *Silviculture* [178] (Leader: Professor M. van Miegroet, Belgium) [179] held five meetings, including one joint session with Sections 23, 25, 31 and 32 and published 51 papers in the Congress Proceedings.

The report of the Section underlined (a) the necessity of giving enough freedom to the WG chairpersons in choosing their collaborators and organizing activities; (b) inappropriateness of giving a composition and structure of permanent WGs at the IUFRO Congress without taking into

[177] The Organisation for Economic Cooperation and Development (OECD) was established in 1961 by 34 countries to stimulate the economic progress and the world trade.
[178] Actual title of the Section – Means for Amelioration of Forest Production. Silviculture (IUFRO 1967c, p.27).
[179]The report of the Section was prepared in French (IUFRO 1967c, pp.191-207).

account in advance possible changes to the functions of proposed members; (c) need to create regional sub-groups if it was very difficult to bring together members of a WG due to great geographical distances; (d) possibility to change the WG's composition according to changes in work and needs; (e) in the case of creation of a WG, the need to take into account linguistic regions beyond those considered at the establishment, etc.

The number of collaborators of the Section increased from 241 (112 organizations in 47 countries) in 1964 to 351 members (165 organizations from 56 countries) in 1967. Between the two Congresses, the Section managers disseminated 11 newsletters to its members.

The *WG on Technical Problems of Silviculture* discussed four general papers by Inspector General C. Letourneux (France) about the work of subgroups during 1961-1967, Professor A. Bonnemann (Germany) about weeding, R. Catinot (France) about mechanization and soil preparation, and Dr. E. Schairer (Germany) about fertilizer use, and 15 papers, including those about weed control in British forestry (J.R. Aldhous, UK) and in the Netherlands (C.P. van Goor); optimum drainage (L. Heikurainen, Finland) and early growth of conifers on cutover peatlands (N. O'Carroll, Ireland), etc.

The WG discussed the difficulties in valuation of small-sized wood. Professor G. Hellinga (Netherlands) had regular contacts with institutes and interested members. Therefore, the composition of this WG had changed considerably since its formation. Instead of organizing regional subgroups as originally planned, it was found more productive to have individual representatives of the three regions in question. Nine papers, regarding the small-sized wood, were presented at the Congress.

All of the most recent IUFRO Congresses (in Rome, Oxford, and Vienna) recommended that Section 23 should be more focused on forestry problems in tropics and subtropics. Section 23 tried to create such WGs and established contacts with some member-institutes in tropics, but the efforts were not successful because of the limited number of research institutions in such regions and their considerable geographical remoteness. Thus, it was considered to follow another path by creating subgroups for Africa, Asia and South America. Such an undertaking necessarily involved more contacts and pushed recruitment of new IUFRO members in three regions (IUFRO 1967c, p.193-4).

Following the proposal of Professor H. Leibundgut (Switzerland), Section 23 held negotiations with the Yugoslav authorities on conservation of the virgin forest in Peručica. To express concrete interest in conservation of the forest in Peručica, it was decided to organize a symposium in Yugoslavia on virgin forest silviculture and new research approaches. The symposium, scheduled for early 1966, was postponed till a later date[180] because of the FAO World Forestry Congress, scheduled for that year. For the same reason, Professor O. Børset recalled his proposal to hold a conference on reforestation in Norway.

Professor H. Leibundgut and Professor J. Köstler (Germany) participated in the conference of the working group on comparison of methods of mapping of forest experiment station (Zürich, May 31 - June 3, 1965), organized by IUFRO Section 21.

Section 23 was in contact with representatives of other interested sections to discuss the creation of a joint WG between Sections 23, 25, 31 and 32 and others who would be interested in thinning-related research. A plenary session of four sections to discuss correlation between

[180]It should be noted that Perućica (Bosnia and Herzegovina), as one of the four areas of rainforest in Europe, received the attention it deserved after the first serious study of the relic forest in 1938. In 1952, the Government of Yugoslavia endowed the status of the "site of scientific research" to this part of the forest of 1,234 ha, saved during the war. In 1954, the area increased by 200 ha, received the status of the natural park, and now, it is part of the National Park Sutjeska (National Geographic 2011).

silviculture and mechanization was held under the leadership of Dr. R. Schober (Germany) on September 6, 1967 for this purpose. Taking into account the complexity and diversity of issues, it was decided to drop the idea to set up such interdisciplinary WG. The meeting agreed that the re-negotiation might be possible after identification of strengths and weaknesses, as well as the most relevant issues for each section, and decided to consider various aspects to make fruitful attempts of discussion and coordination.

Several members of the Section participated in the World Consultation on Forest Genetics and Tree Improvement, organized by the FAO in 1963 in Stockholm, and chaired by Professor J.D. Matthews, Leader of IUFRO Section 22. A limited number of members attended the courses on the use of radioisotopes in forestry research, organized in Germany by the Atomic Energy Branch of FAO in collaboration with the International Atomic Energy Agency[181]. Members of the Section participated in the World Symposium on Manmade Forests and Their Industrial Importance, organized by FAO at Canberra, Australia in 1967 (Unasylva 1967), and events of the International Union of Biological Sciences[182].

The following papers were submitted to the WG on Growth and Development of Forest Stands: assessing the forest quality and stand development (7 papers), growth of trees and stands in relation to the processing and location (12), and phenological and physiological issues (7 papers). Dr. K.F. Wenger (USA) made an introductory presentation on multipurpose forestry issues (multiple-use silviculture). Professor A. Bonnemann (Germany) presented the final report of the group on silvicultural terminology. His report was printed and could be sent to members on the demand.

The *WG on Silvicultural Problems and Valuation of Wood of Small Dimensions* received 12 papers and discussed four general presentations by G. Hellinga (Netherlands), H. von Pechmann (Germany), D. Mlinsek (Yugoslavia) and C. Moulopoulos (Greece). Professor H. von Pechmann talked about difficulties of reforestation; P. Abetz (Germany) spoke about spruce monocultures, H.H. Hilf (Germany) highlighted future challenges in softwood lumber production in Central Europe, other papers covered problems of hardwood reforestation in South-Eastern Europe (D. Mlinsek) and in Greece (C. Moulopoulos and S. Dafis), effect of spacing on dry matter production in red pine plantations (R.J. Hutnik and K.H. Hickok, USA).

Finally, the general meeting of the Section discussed the future work, agenda for the next Congress and other issues. All WGs maintained regular contacts with Section 01 of IUFRO and the Joint FAO/IUFRO Committee on Bibliography and Terminology.

In addition, the Section stressed that it was essential to give young scientists an opportunity to manifest their abilities. The continuity of research should be ensured at least as the level of the Section. It should also promote young scientist and encourage particular interest to new ideas and methods. This interest should be reflected in the organization of Section activities. To achieve these intentions and mitigate current difficulties, the Section proposed to organize its work as follows:

"a) It is necessary to encourage and organize collaboration and direct contacts among a limited number of specialists who deal with the same problems. To this end, it is necessary to create many WGs. These WGs may meet at their convenience during the period between Congresses.

b) A collective report of the WGs will provide a basis for discussions at the next Congress. This report will be sent to interested members of the section at least three months before the date of the next Congress. In this way, the number of individual communications will be significantly

[181] The International Atomic Energy Agency (IAEA) was founded in 1957 to promote collaboration in the peaceful use of nuclear energy.

[182] The International Union of Biological Sciences (IUBS) was founded in 1919 to promote scientific information and environment. The second aspect of IUBS activities led to the foundation of the IUCN.

reduced and members will have the opportunity to properly study the reports submitted for the general discussion.

c) If the need arises, the Section Leader will invite individual members to express their views on particular aspects of the problems, addressed by the WGs (communications are invited).

d) At the next Congress, at least two sessions of the Section should be devoted to the study and discussion of individual communications on new methods or research that is not covered by any WG. The Section Leader will determine topics to be addressed.

e) The next Congress will be essential to increase the number of work sessions in the Section. If possible, 8-12 sessions would be needed" (IUFRO 1967c, p.200).

The *WG on Use of Fertilizers* stop its work in their current state in Section 23, and then resumed in Section 21, in particular, at international comparison of chemical analysis methods, which were found clearly important for the Group. Other issues to be studied should be identified upon consultation with the Presidents of Sections 21, 23 and 25.

The *WG on Soil Preparation and Mechanization* continued its work and was going to concentrate on inventory of different methods of soil preparation and selection of the most suitable types of equipment as well as test protocols on soil preparation techniques for forest plantations.

The *WG on Herbicides* continued its work and focused on problems in Central and Western Europe. It would attach particular importance to the development of a complete list of all scientists, interested in the use of herbicides in nurseries and forests. It was necessary to organize a regular exchange of publications.

The *WG on Valuation of Small-Sized Hardwood* decided that the first phase on this work had been completed.

The *WG on Terminology of Silviculture* had completed its basic activities with the publication of the list of terms and definitions in five languages. This good result was achieved thanks to the dedication of Professor A. Bonnemann of Hann. Münden (Germany), who had been leading the work since the 12th Congress in Oxford (IUFRO 1967c, p. 200-202).

The last session discussed the final report and recommendations of the Section. During four days, 142 people from 31 countries participated in the discussions; the sessions were attended by 373 people (80-102 per day). According to the recommendations of the Section to the Congress, the abundance of papers/presentations made it impossible to have a proper discussion as 54 scientific papers on a total of 678 pages had been submitted to the Section. It was impossible to give more than 5 minutes to each presentation which was not likely encourage in-depth discussion of issues. The general debate also became difficult because most members had not read the text before the Congress (IUFRO 1967c, p.199).

During the working session on September 8, 1967, Section 23 discussed the recommendations and proposals, made by its members. Based on the discussions and experience gained during the period of 1961-1967, Section 23 decided to establish 13 working groups. These WGs are: 1. Study of Virgin Forests (WG Leader: Professor H. Leibundgut, ETH in Zurich, Switzerland), 2. Silviculture in Tropics (WGL: Professor H. Lamprecht, Hann.Münden, Germany), 3. Multiple Use Forestry (WGL: Dr. K.F.Wenger, USDA Forest Service, USA), 4. Mountain Forestry Problems (WGL: Professor H.Mayer, BOKU, Austria), 5. Afforestation and treatment of forests on very wet or boggy/peaty soils (WGL: Professor L.Hekurainen, University of Helsinki, Finland), 6. Afforestation in arid and semi-arid zones (WGL: Professor E.Giordano, Centro di Sperimentazione Agricole e Forestale, Italy). 7. Transformation of stands (WGL: Professor Morandini, Universita di Firenze, Italy), 8. Treatment of young stands (WGL: Professor D. Mlinsek, Inst. za go jenje gozdov, Ljubljana, Yugoslavia), 9. Research on thinning (WGL: P.Abetz, University of Freiburg, Germany), 10. Soil Preparation and Mechanization (WGL: Mr. J.Catinot,

Centre Technique forestier tropical, France), 11. Use of Herbicides for Weed Control (WGL: Professor A.Bonnemann, University of Göttingen, Germany), 12. Characteristics of Plants Used for Afforestation (WGL: Professor H. Schmidt-Vogt, University of Freiburg, Germany), and 13. Terminology (WGL: Professor A.Bonnemann, University of Göttingen, Germany).

Section 23 also drew attention of its members to the so-called "free themes" that might be communicated at the next Congress, including: a) Phenology and physiology of root growth; b) Analysis of populations and study of their dynamic evolution; c) Study of the concept of the stand "balanced structure"; d) The growth of mixed stands; e) Assessment of requirements and character of species by physiological or biochemical measurements; f) Relationship and reciprocal influences between individual trees (IUFRO 1967, p.202-207).

Section 24 *Forest Protection* (Leader: Professor A.Biraghi, Italy) held 17 sessions including one jointly with Section 22. After the Congress in Vienna, two new WGs were established in this Section: on Forest Fire Control and on International Cooperation in Forest Insect Research.

The *WG on Population Dynamics* was informed that in 1963 a meeting had been held in Laanila (Finland), where eight papers on the outbreaks of *Blastophagus piniperda* had been discussed. In 1965, 23 specialists met at Prague to discuss influence of pesticides on the dynamics of population. The upcoming meeting was scheduled for September 1967 to be held in at Antibes (France).

In 1964, the *WG on Mycorrhiza Research* held a meeting in Puerto Rico and made a number of observations during field tours in experimental plots. As a result, a few recommendations for new trials were proposed. In 1966, Professor Björkman visited many countries where he studied different forests from mycorrhiza point of view. At the Congress, the WG held two sessions where 19 papers were submitted to highlight two major areas: classification and general issues of mycorrhiza research and the physiology and ecology of mycorrhiza. Before that, WG Leader E.Björkman (Sweden) reported about the WG activities and meetings since 1961 Congress.

Concerning classification, the papers were presented on taxonomy (B.Boullard, France; J.M.Trappe, USA) and terminology related to mycorrhiza (S.A.Wilde, A.Lafond and B.Fassi, Canada), seasonal development of root initiation and mycorrhizal development in *Pinus resinosa* (H.E.Wilcox, USA), mycorrhizal fungi of pine (*Pinus silvestris*) – *Lactarius rufus* (Scop. ex Fr.) Fr. and yellow false truffles (*Rhizopogon luteolus*, Fr., and Nordh.) in vivo and in pure cultures of pines (R.Pachlewski, Poland); quantitative estimates of mycorrhiza populations in *Pinus radiata* (G.C.Marks, N.Ditchburne and R.C.Foster, Australia); mycorrhizal types in nurseries (F.Göbl, Austria) and agricultural soils (B.Fassi, Italy), etc.

There were also many papers, addressing protective effects of mycorrhizal fungi on the host plants (V.Šašek, Czechoslovakia); renewed growth of ectotrophic mycorrhizae as an indication of unstable symbiotic relationship (V.Slankis, Canada); inhibition of the growth of mycorrhizae using indole acetic acid (J.A.Fortin, Canada); on the phosphate uptakes by mycorrhiza (G.D.Bowen and C.Theodorou, Australia); mycorrhiza and Scots pine relationship (O.Laiho; C.Mikola, Finland) etc.

The *WGs on International Cooperation in Forest Disease Research and on International Cooperation in Forest Insect Research*, organized in 1964 in cooperation with the Forestry and Forest Products Division of FAO, held a Symposium on Internationally Dangerous Forest Diseases and Insects (Oxford, UK), attended by about 140 participants from about 40 countries and agencies.

This issue caused justified concern because "in the United States losses from diseases alone equalled half the timber cut annually in that country. In Honduras, a virtually uncontrollable outbreak of bark beetle began during the year, and half a million hectares of pine forest had already been destroyed" (UN 1964, p.501).

Over 15 major topics were discussed: (1) appraisal and prediction of international forest disease hazards, (2) the international spread of forest pathogens, (3) the spread of forest insects in

the world with particular reference to biological control, (4) forest insect conditions by geographic regions, (5) known and potential hazard from root rots, (6) cankers of forest trees, (7) stem diseases of conifers caused by rust fungi, (8) heart rots, (9) mistletoes, (10) virus disorders of forest trees, (11) vascular wilt diseases, (12) foliage diseases, (13) reports on the forest disease situation in different countries, with emphasis on the impact on forest production, (14) quarantine measures, (15) forest disease and pest control, (16) establishment of disease susceptibility plantations. The Symposium suggested a certain number of recommendations, and in 1966, a special Committee of EPPO[183] examined and considered these recommendations.

This *WG on International Cooperation in Forest Disease Research* chose the following five major themes for discussion at the 14th IUFRO Congress: (1) Distribution, impact and control of *Dothistroma pini* and *Marssonina* in poplar; (2) Effectiveness of control measures for *Fomes annosus*; (3) Quantification of losses from forest diseases; 4) International cooperative projects; and (5) Coordination of plant quarantine regulations. The WG planned to discuss preparation to the third meeting on *Fomes annosus*. At the three sessions during the Congress, attended by 40 to 60 participants, 33 invited and 16 contributed papers were presented. E.g., the working party on coordination of plant quarantine regulations received 20 papers from many countries, showing the wide scope of the issue in Western and Southern Europe (E.Donaubauer, Austria), Northern Europe (F.Roll-Hansen, Norway), Eastern Europe (R.Leontovyc, Czechoslovakia), North America (D.S.MacLachlan, Canada), Australia and New Zealand (G.W.Guilmour, Australia). Other issues were: bacterial canker of poplar and aspen (M.Ride, France; A. de Lange, Netherlands; J.R.Hansbrough, USA), etc.

The *WG on International Cooperation in Forest Insect Research* discussed 17 papers and held three technical sessions, attended by 30-50 participants. The following themes were discussed: (1) impact of indigenous insects on exotic plantations, (2) aspects of forest insect control, (3) biological control of wood-boring insects, and (4) general papers.

The *WG on Fume Damage* held two sessions and, attended by 29 participants, discussed six invited papers on the importance and possibilities of breeding for resistance to fume damage.

In 1965, it was agreed that one of the main aims of the *WG on Forest Fire Control* should be to accumulate fundamental scientific knowledge in this field and develop an ever-increasing interest to research in forest fire control, including collaboration with Section 23. At the Congress, this WG held three technical sessions, attended by about 20 participants who discussed 5 general and 8 discussion papers. Much attention was paid to fire prevention, particularly, in coniferous plantations, including mechanisms (C.E. van Wagner, Canada) and systems for assessment of forest fire behaviours (J.S.Barrows, USA); to problems facing fire research, as seen by a forest officer (C.A.Connell, UK), as well as consequences of management decisions (R.K.Arnold, USA) and comparison of forest fire fighting in North America and Germany (E.Liebeneiner, Germany), etc.

The joint *WG of Sections 22 and 24 on Genetic Resistance to Disease and Insect Attacks* discussed 9 papers, including international aspects of blister rust resistance in white pines (R.T.Bingham, USA; R.F.Patton, USA), reaction to *Marssonina brunnea* attack in several clones of poplar (E.Castellani and G.P.Cellerino, Italy), resistance to insects in poplar in Italy (G.M.Arru, Italy), susceptibility of white poplar species and hybrids to a *Pollaccia radios* (H.Zysha and H.Weisgerber, Germany), root exudates, acting on *Fomes annosus* (A.Hyppel, Sweden), cage testing for resistance in eastern white pine to the white pine weevil (D.P.Connola, USA), variability in the invasion of larch (*Larix* sp.) by the woolly aphids *Adelges laricis* and *Sacchipantes viridis* (J. Šindelarář and R.Hochmut, Czechoslovakia), and resistance and adaptation of various conifers to

[183] The European and Mediterranean Plant Protection Organization (EPPO) was founded in 1951 as a regional organization, promoting cooperation in quarantine and plant protection in Europe.

Ips sexdentatus (C.Chararas, France). “Two new study groups were authorized to arrange panel discussions on Biological Control of Forest Diseases and Scleroderris Canker of Conifers, at the next lUFRO Congress” (IUFRO 1967c, p.210).

Section 25 *Study of Growth and Yield and of Forest Management* (Leader: Professor F.Firat, Turkey) reported to the Congress that in 1961-1967, the only formal meeting of the section was held at the World Forestry Congress in Madrid (1966). The Section greatly benefitted from the work, done by the *Advisory Group on Aerial Photography Application in Forestry* which prepared Aerial Photographs in Forest Inventories; Applications and Research Studies (IUFRO 1963), and the *Advisory Group of Forest Statisticians*, which prepared a survey on training in statistics and use of electronic computers at forestry universities and schools (Takata 1968). Some work was done by the Working Party on study the sources of errors in the determination of increment, especially with the use of increment borers (Ohtomo 1966) and on terminology within the competence of the section as well as on tropical forestry.

The Section discussed 61 presentations, including 50 papers, published in the Congress Proceedings (IUFRO 1967b, Vol. VI), at the meetings of the following six newly established WGs: (1) *Forest Working Plans and Yield Regulation in European countries*, (2) *Application of Modern Planning Techniques (Operations Research, etc.) in Forest Management*, (3) *Mensuration of Forest Biomass and its Productivity*, (4) *Mensuration Problems in Forest Inventories in Tropical Area*s, (5) *Definition of Forest Land and Methods of Land and Site Classification*, (6) *Variation in Forest Stands as a Basis for Planning Experiments*. Besides, the Working Party’s collaboration with International Biological Programme (IBP) was established. In addition, the existing groups, such as the *Advisory Group of Forest Statisticians*, *Estimation of Increment*, *Terminology* and the *Advisory Group on Aerial Photography* discussed their issues.

It should be mentioned that the group on Aerial Photography was closed though the Congress documents did not explain why. Meanwhile, it is necessary to mention here such as papers those on: photographic volume estimation in forest inventory (A.Nyyssonen, Finland); training in photo-interpretation of forest areas in tropical countries (D.A.Boon and D.A.Stellingwerf, Netherlands) and screening tests for rating photo interpreters (T.E.Avery and T.Burkhart, USA); variation in forest stands as a basis for the planning of experiments (J.Fries, Sweden); simulation and forestry (E.M.Gould, USA); measuring biological parameters in the forest environment (H.A.I.Madgwick, New Zealand); the Advisory Group of Forest Statisticians as a service to forest research and management (J.N.R.Jeffers, UK), etc.

Section 26 *Forest Recreation and Wildlife*[184] (Leader: G.M.Jemison, USA) reported to the Congress that by 1964, about 100 correspondents had expressed interest in recreation and wildlife research, and by the mid-1967, their number increased to 307 from 56 countries. Contacts were established with several international organizations with similar interests, including the FAO which had special programs, related to wildlife and considering it as a source of additional food protein in developing countries, thus, restoration of forests was needed as a wildlife habitat. In May, 1963, there was a discussion of IUFRO’s program with the Executive Board of the IUCN; and the World Wildlife Fund (Washington, D.C.) also endorsed its program. Other promising discussions were held with members of the Council of Europe’s Committee (about nature and landscape conservation) as well as with representatives of several institutions (about the way this activity of IUFRO might fit into the International Biological Program).

An informal meeting of the future Section was held at the World Forestry Congress in Madrid

[184] The Section was established at the Congress in Munich while preliminary work had been initiated in September 1962 when the issues were discussed at the IUFRO Permanent Committee meeting in Dublin, Ireland.

on June 13, 1967; it was attended by 37 delegates from 17 countries. They discussed the scope and areas of work. In 1967, the International Council endorsed and adopted the establishment of Section 26: Forest Recreation and Wildlife. The Section at its four session discussed 35 presentations (33 were published) in 8 WGs: (1) *Human behaviour in forests and related landscapes*, (2) *Economies of recreation and wildlife*, (3) *Ecologic factors*, (4) *Wildlife habitat*, (5) *Coordination of timber management practices with recreation and wildlife management*, (6) *Establishment, improvement and maintenance of recreation and wildlife values*, (7) *Definition and measurements*, (8) *Policy, planning and management*, (9) *Documentation*, (10) *International tourism*.

The Section was of great interest. In the morning session of September 6, 1967, the attendance was 57 people, and in the evening, it brought together 45 participants. At one of the sessions, the discussion about the name of the Section continued. The German delegation suggested naming it *Erholung und Tier- und Pflanzenwelt* , but it was considered not completely acceptable, and the French version *Récréation et vie Sauvage* was considered acceptable. Finally, the name was chosen in English: *Recreation and Wildlife* as proposed before to the International Council.

At the final session on September 8, 1967, it was noted that the chosen name of the Section and definition of terms were acceptable in all the three official IUFRO languages. The session addressed the need to have a Directory of scientists, collaborating in the Section; defined research areas, related to methods of measurement and inventory of recreation uses and activities; and identified ways to improve forest uses for recreation and wildlife habitats.

Over 30 various papers were submitted to the Section, covering such areas as: scope (R.K.Arnold and W.S.Hopkins, USA) and techniques of recreation research (J.A.Wagar, USA); basics and tasks of forest recreation research in Norway (S.Huse), in Belgium (J.Thas), in the USA (L.C.Merriam, Jr.; G.A.James and G.D.Taylor), recreation and wildlife research in tropical forests (K.Curry-Lindahl, Sweden), in Australia (H.S.Curtis) and in the Netherlands (D.Burger); rating of general welfare without use of expert opinions only through objective measurements (W.Bitterlich, Austria); relationship between man and nature (F.L.Newby; M.Eyama), forest recreation and conservation (M.Buchinger, USA), silviculture and recreation (O.Børset, Norway); multipurpose forest management and nature conservation (M.Maldague, Canada), forest management and recreation (E.Niesslein, Germany); and about 10 papers about wildlife, its behaviour and hunting.

Section 31 *Forest Economics* (Leader: Professor N.K.Hermansen, Denmark) reported to the Congress that the number of collaborators of the Section had increased from 50 in 1961 to 125 (from 27 countries) in July 1967. During the reporting period, five meetings were held (in Ireland, Finland, Canada, Spain, Germany, and including the current session at the Congress). In addition, in 1966, an informal meeting was held at the World Forestry Congress. During the reporting period, the Chairman disseminated six circulars.

The Section received 39 papers and discussed many of them at five sessions at the Congress. The *WG on Forestry Accounting* was designated “to investigate how changes in the value of growing stock can be taken in account in the most simple and appropriate way in the profit and loss account and in the balance sheet of forest enterprises” (IUFRO 1967c, p.225). It discussed various valuation methods and value concepts, especially the market value and the expectation value, practical examples of which were developed by R.Frauendorfer (Austria) and P.A.Wardle (UK), respectively. Besides, other methods and concepts were discussed, and “the group concluded that the choice of methods and value concepts depended on the management objectives and on the purpose of the accounting. In this way the group did not reach any universal solution of the problem” (ibid., p.225). The very intensive work of the group resulted in an extensive report to the Congress, including contributions from P.A.Wardle, R.Frauendorfer, W.M.Cormack and H.D.Brabänder (Germany) on

the forestry accounting. Furthermore, the group prepared and presented overviews from several countries on the profit and loss account in actual use.

After the IUFRO Congress in Vienna, representatives of the WG participated in the FAO/ ECE Joint Working Party on Forest and Forest Products Statistics in Geneva (1964) where the account system was approved as a valuable basis for assessing the capital formation in forestry. The WG discussed this issue at one of its sessions. It also discussed the use of and proposed changes in the accounting terminology in French and English as the framework of accounts had been published by IUFRO in the three languages in 1966 (IUFRO 1966a)[185].

A proposal of a new classification of labour costs had been worked out in collaboration with the International Labour Office (ILO). For various reasons, the *WG on Management Plans and Economic Control* was not active between the Congresses.

The *WG on Methods and Problems of Cost Calculation in Forestry* held three meetings between the Congresses (Denmark, Germany and Norway). Its main task was to study the methods and problems of cost calculation in forestry, e.g. cost registration, distribution and calculation of unit costs, analysis of cost structure and development, as well as purpose and methods of cost comparisons. The other task of the WG was to act as an advisor for a project, aimed at comparing costs and revenues in different counties in Europe, elaborated by the Forestry Research Institute of Sweden[186] in Stockholm. Contributions to the report of the WG to the Congress were delivered by F.Jørgensen (Norway), H.K.Hermansen (Denmark), W.Schwotzer (Switzerland), as well as G.Speidel (Germany), A.Svendsrud (Norway) and K.V.Algvere (Sweden), who were not formal members of this WG.

The *WG on Methods of Forecasting in Forestry and Timber Economy* was designated to analyse the main forecasts available in forestry and forest products, study objectives and requirements of successful forecasts, define basic concepts and terms for the selection of the most relevant variables and models of forecasting, and to find major gaps to be addressed in future research. Between the Congresses, this WG held several meetings (Norway, twice in Finland, and in Spain). The report of this WG to the Congress included a general introduction (V.Holopainen, Finland), and parts about short-term forecasting of demand (P.Riihinen, Finland), long-term forecastting of demand (H.R.Josephson, USA), short-term forecasting of supply (R.Sæther, Norway), long-term forecasting of supply (H.J. Vaux, USA), forecasting consumption and price (G.R.Gregory, USA) as well as final conclusions and a comprehensive list of literature (K.Mantel, Germany).

The discussion papers were submitted to the Section, but there was no time to read the papers about: theoretical foundations of optimization of the decision-making at forest management unit (M.Botwin, Poland); practical approach to private forest management in Canada (A.R.C.Jones), investigation into the most profitable management diameter sub-class of silver fir for sawmill conversion (U.Golubović, Yugoslavia); simple method of optimum repartition of chief timber assortment production to subordinate units (M.Novotný and J.Parez, Czechoslovakia); and papers, prepared by M.Plavsic and T.Tampler, and E.Suwara, but these papers were published in the Congress Proceedings (IUFRO 1967b, Vol. VIII, pp. 257-321).

The *WG on Methods of Measuring Labour Productivity in Forestry and Forest Industries* reported that between the Congresses it had held three meetings (Oxford, Stockholm and Madrid), worked closely with the FAO/ECE study group, dealing with methods and organization of forest

[185] Later, the International Labour Organization (ILO), founded in 1919, and in 1946, it became the first specialized agency of the United Nations Organization.

[186] Established in 1828 as a forest education, training and research institute with the aim to preserve Swedish forests.

work. The WG attempted to make a review of the methods and results in measuring productivity of labour, using experimental comparison of international trends and productivity levels in the forest sector in different countries. To this end, a questionnaire had been sent to 25 countries. As it seemed to be difficult to obtain required data, the WG presented only a much abbreviated report. However, it was recognized that this work should continue.

After the presentation and discussion of papers by W.Kroth (Germany) and E.T.Williams (USA): Forest Valuation for Taxation Purposes (IUFRO 1967b, Vol. VIII, pp. 218-256), it was proposed to establish a *WG on Taxation*.

At the final meeting of the Section, it was decided to establish the following WGs: (1) *National Income Accounting for Forestry* (WG Leader: Professor L. Heikinheimo, Finland); (2) *Impact of Forest Taxation and other Governmental Measures on Forest Practice and Economy* (WGL: Dr. W.Kroth, Germany); (3) *Forest Economic and Social Considerations and Economic Development* (WGL: J.A.Zivnuska, USA); (4) *Forecasting in Forestry and Timber Economy* (WGL: Professor V. Holopainen, Finland); (5) *Managerial Economics* (Coordinating Chairman: Professor N. K.Hermansen, Denmark); and (6) E*valuation of Supply and Demand of Recreational Facilities in Forests* (WGL: Professor C.Wiebecke, Germany)

The *WG on Managerial Economics* was divided into five subgroups, namely, 1. Planning Theory (Chairman: J. von Malmborg, Sweden); 2. Operational Research (Chairman: P.Wardle, UK); 3. Organisation Theory (Chairman was not nominated); 4. Cost/Revenue Comparisons through Hypothetical Models (Chairman: Professor E.Stridsberg, Sweden); 5. Investment Problems in Forestry (Chairman: Professor F.Jørgensen, Norway).

Section 32 *Operational Efficiency* (Leader: I.Samset, Norway) reported to the Congress that two meetings had been held in the period between the Congresses (Geneva, Switzerland, and Montreal Port Arthur, Canada). The conducted research was related primarily to logging and wood-processing, forest worker remuneration and work conditions, logging in mountains, as well as ergonomics and organization of work in the forest. About 33 discussion papers and additional five other papers were presented at the sessions.

The *WG on Logging and Wood-Processing* received seven papers. They were related to: wheeled skidder experiments in Appalachia (H.W.Parker, USA); environmental factors and their effect on the productivity of tree-length skidding (H.J.Winer, Canada); timber yards as an important part of modern skidding technology (F.Piškula, Czechoslovakia); influence of varying limbing quality upon the output in felling spruce pulpwood (M.Kahala, Finland); dimensional structure of saw timber as a load in its transportation from forest (S.Radziminski, Poland); limbing devices (J.S.Hensel, USA); experiments on the shearing of wood (J.S.Johnston, Canada).

The *WG on Work Studies and Payment Systems* received the following papers in German: on wage rates (H.B.Platzer), methods used to determine time, required for the work of a forestry company (S.Häberle) and basics for time predicting in timber operations (W.Landschütz).

The *WG on Logging in the Mountains* received papers mostly about logging, including modern logging procedures (R.Meyr), general operational problems (R.Wettstein), technique and technology of logging in the USSR (A.Livanov), types of operational organization of logging and transportation (M.Dressler and V.Staud), and organization of logging in Japan (S.Kato), intensive management and fine exploitation (T.Moroto), aerial logging possibilities in North America (H.H.Lysons).

The *WG on Organization of Forest Work* discussed a few papers, mainly, prepared by the German scientists, and related to work organization in forestry (St.Szeless), planning of operational systems (H.H.Hilf, Germany), fundamentals of application of network planning and management (G.Kaminsky, Germany), organizational requirements for economically best forestry (K.Matyás,

Hungary). Other papers covered cultivation, including engineering systems for direct seeding southern pines in the USA (H.T.Taylor), tools and machines for the protection of forest young plantations against browsing by game (S.Matusz), new trends in silvicultural businesses (G.Reissinger).

The *WG on Ergonomics* arranged a symposium at Wageningen, Netherlands, in May 1962 to discuss such issues as noise and vibrations, and in September 1965 at Reinbek, Germany, to discuss occupational health research in the forest sector and the checklist of ergonomic indexes for machinery and equipment in the forest sector, which was agreed upon at the Congress. After the report of the WG made by its Chair G.Kaminsky (USA), a few papers were presented for discussion: on development and use of an ergonomic checklist in forestry (J.H. van Loon, Netherlands), comparison of anthropometric data from populations of European and Asians as a means to predict their working capacity (E.G.Strehlke, Switzerland), ergonomic view-points on working methods and tools to be used in logging operations in India (N.Lundgren, Sweden), ergonomic considerations of mechanized logging operations (K.R.Čermák, Czechoslovakia), ergonomic criteria in the organization of production processes in forestry (M.Botwin, Poland) and audiometric measurements of forestry equipment (J.Weincl).

The *WG on the Influence of Mechanization on Silviculture* was established at the Vienna Congress in 1961 as a joint group of Sections 23, 25, 31 and 32 to work mainly on thinning problems. The WG participated in the meeting of the Joint FAO/ECE/ILO[187] Committee's study group on Methods and Organization of Forest Work in Geneva (March 1966).

The joint session of Sections 23, 25, 31, and 32 was dedicated to thinning. It was B.Ager and A.Staaf who reported on behalf of Section 32, speaking, respectively, about correlation between silviculture and mechanization and about views on mechanized thinning operations.

The joint *WG on Labour Productivity* united specialists of Sections 31 and 32 and met in Oxford (1962) and in Stockholm (1963). It was decided that in the first phase the group should concentrate on human labour in logging. During the Congress, representatives of this WG presented three reports on labour productivity in Section 31.

The *WG on Terminology* continued its work, and in addition to its report to the Congress (U.Sundberg, Sweden), it presented its study on terminology of forest operations and national publications, highlighting research in this area.

The *WG on Terrain Classification* was created at the meeting in Montreal in 1964 with the aim to find a common classification system of land, and held a meeting in Sweden in 1966. It was decided to approve the classification of land areas, proposed at the Congress, and to include it in the description of forest site infrastructure.

The *WG on Education* (University Courses) was established at the Congress of 1961. After discussion of the report to the Congress, it was decided to pay special attention to training courses on logging, developed and introduced by universities in developing countries, to support the FAO in its efforts, and to keep monitoring such courses in different countries.

Section 32 agreed to establish five new WGs as follows: Harvesting and Transport, Mountain Logging, Reforestation Techniques, Work Study, Payment and Labour Productivity, and Operations Research and Logging Systems. The new name of Section 32 was Forest Operations and Techniques.

The Section presented a book of the reporting period: Proceedings of the meeting of Section 32, Operational Efficiency, in Montreal and Port Arthur 15th-25th September 1964, 415 pp. It also prepared a list of Section 32 papers, published by IUFRO since 1954. The list included 136 entries.

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[187] The Joint FAO/ECE/ILO Committee on Forest Working Techniques and Training of Forest Workers was established in 1954 to assist countries in these areas, and later the title was changed to the Joint FAO/ECE/ILO Committee on Forest Technology, Management and Training to reflect the changed goals– 'to optimize the supply of wood from their forests for the reconstruction of their economies'.

Section 41 *Forest Products* (Leader: E.G. Locke[188], USA; A.D. Freas, USA)

According to the report, the Section made significant progress after the Vienna Congress where it had been renamed into Forester Products. It established three new WGs, designated to address: Wood Quality, Wood Behaviour in Fire, Sawmilling and Wood-Processing. Three workshops were held between the Congresses: in 1963 on the occasion of the 5th FAO Wood Technology Conference (Madison, Wisconsin, USA); in 1965 in the Divison of Forest Products of the Council for Scientific and Industrial Research (Melbourne, Australia); and in 1966, in the Centre of Forest Technology/Centre Technique du Bois (Paris, France). The published proceedings of each meeting were submitted to the IUFRO Archive.

As if competing with Section 22, this Section had 18 sessions, including four joint meetings where over 20 papers were presented. Four out of the 18 half-day meetings were held by Section 41 jointly with Section 22 in the format of symposia. Two symposia were interdisciplinary in nature and reviewed the two areas, which aroused the greatest interest: the spiral grain and heartwood formation and usage.

In that context, it is worthwhile to mention observations of the Co-Chairman of one session at the Spiral Grain Symposium. The first session was chaired by Dr. P. Larsen and was focused on causes and effects of this phenomenon, with the second one chaired by Dr. J.M. Harris and focused on measurement and sampling methods. In particular, Dr. J. Maddern Harris noted: "The effects of spiral grain are obviously greatest in species where the defect develops most strongly and persists for most of the growing life of the tree; and the effects are most noticeable when drying conditions, or moisture fluctuations in use, favour the development of twist or other distortions. This is why countries like South Africa growing *Pinus roxburghii* (the classical tree for spiral grain) and *Pinus patula* are particularly conscious of spirality – especially since the e.m.c's of their coastal and inland regions afford such extreme contrasts in moisture content. Nor can New Zealand afford to be smug about this: from various discussions it became quite obvious that changes in methods of utilisation or the use of other species could quickly change the emphasis in this country also" (Harris 1967,p.3-4).

The papers were discussed in the following ten WGs: Microscopic Characteristics of Wood Quality, Macroscopic Characteristics of Wood Quality, Mechanical Conversion, Performance of Wood in Fire, Tree and Wood Chemistry, Wood Physics, Wood Protection, Structural Utilization, Terminology, and Mechanical Properties.

In addition, the discussions were held in the subgroups (committees); e.g., the *WG on Macroscopic Characteristics of Wood Quality* discussed the papers in the following five sub-groups: 1. Tree Growth Stresses with a focus on fast-growing species; 2. Quality Requirements for End Uses with a focus on the need for classification of tree species, based on their uses and quality; 3. Pruning Effects on Wood Quality, noting the marked increase in the number of publications on the subject; 4. Relationship Between Surface Characteristics and Internal Properties of Wood, such as measurements of timber weight or volume, timber trade, depending on wood quality characteristics.

At the session of the *WG on Mechanical Conversion*, attended by 40 participants, the focus of the discussion was on the preservation of existing and creation of new areas of wood processing, such as wood chips for pulp production. After the introduction, made by the Chair (B.Thunell, Sweden), special presentations were made to provide information about basic studies (W.M. McKenzie, Australia), sawing (B.Thunell), machining (K.Dziobek, Germany), slicing and veneer cutting (Mr.Lutz, USA), instantaneous cross cutting (Mr.Johnston, Canada) etc., demonstrating genuinely international teamwork in IUFRO. The WG reach the following agreement that: "1. The existing sectors should remain. 2. If possible, a new sector should be organized to cover chipping for pulp and particle boards. 3. Because of increasing concern, noise control should be given special

[188] Dr. Edward G. Locke, who had led the section since 1961, died on December 19, 1966.

attention, within the machining sector. 4. Band re-sawing should be emphasized, since interest in this is growing. 5. The next meeting is be arranged as a separate one for the group, preferably in Europe, in about 2 years' time. 6. A strong desire was expressed that in the next meeting more time should be allowed for each item, and the total time must be longer. 7. If possible, there should be more concentration on specific subjects. A hope was expressed that the papers should be reproduced and distributed in advance of the meeting, for study by the members" (IUFRO 1967c, p.244).

To give an example of really active work, the Wood Protection WG may be mentioned: it prepared and published a thematic glossary in English and embarked on the development of a multilingual vocabulary and glossary. They reviewed proposals on the development of international guidelines on field trials to assess natural durability and effective conservation of wood in various climatic zones, to identify causes of low permeability and design methods for assessing wood permeability. Summing up the work of the Section, some of the delegates expressed the opinion that the importance of IUFRO research, related to forest products, could not be duly presented by only one section. Nevertheless, the Section Leader informed the audience that it had been already considered by the Permanent Committee, which had decided to preserve it as a separate structural unit of IUFRO.

Dr. J. Swiderski from the FAO spoke about the proposal to hold an international consultation on wood utilization for housing and other construction. He asked the Section to assist in developing and preparing a part for the technical program. After a brief discussion, it was decided to provide such support.

At their concluding meetings, practically all the Sections discussed proposed new groups, workplans and themes for the next Congress.

Organizational matters

The International Council had two meetings on September 4 and 8, 1967 in the Bavarian Academy of Sciences in Munich. The USSR was represented by Professor I.S. Melekhov.

The IUFRO President reported about the changes in the leadership at the section level and in the composition of the Permanent Committee and also about meetings during the reporting period; he also informed the meeting that Miss Feld had been appointed to the position of Technical Advisor, in accordance with Article 6 of the IUFRO Statutes. He noted that all the work to develop the terminological dictionary had been re-assigned to Vice-President V.L. Harper who was substantially assisted by the U.S. Forest Service. The President worded the proposal to put in place a IUFRO archive (to be based in Freiburg) to pool all historical documents of the Union; he informed the meeting about the number of IUFRO members, financial situation of the Union; read out the proposals: to establish a new section – Section 26 *Forest Recreation and Wildlife*; to rename Section 32 into *Forest operations and techniques*; to set up working parties to address the division of Section 24 into two sections (insect pests and diseases) and to establish a section on forest statistics.

The meeting heard reports about cooperation with international organizations, including the FAO and International Society of Wood Science and about negotiations with the Research Council for Natural Resources and UNESCO. In the letter of April 7, 1967, the UNESCO had not accepted the proposal on the accession of IUFRO to the UNESCO at the information sharing level. N.A. Osara read the FAO's proposal to define and classify forest areas and forests. Though it was a very complicated task, the IUFRO International Council welcomed the willingness of Section 25 to take the lead in exploring this task and set up a working group. The Sections reported about the work done. In conclusion, the meeting heard proposals on the composition of the Permanent Committee and candidates for Section Leaders. Professor A. de Philippis proposed to award the title of the Honorary Member of the Union to Professors J. Speer and V.L. Harper. Professors K. Mantel and

E. Holmsgaard nominated E. Saari and M. Kreutzinger for this award. The International Council supported and the Congress approved those nominations.

At the closing ceremony of the Congress, Professor J. Speer pointed to the unprecedented number of participants of the Congress which manifold surpassed all the previous Congresses. Summing up the Congress, he said that each Section continued its work at the bibliography and multilingual terminology, confirming the still high priority of the efforts which had been quite important as of the time of the Union establishment. Another important task to be further pursued was to describe the history of selected tree stands and forests. Efforts to create an international biography of prominent foresters had been made. In addition, the Union identified new objectives and areas to be addressed. The most important of them were improved methods of statistical data processing; applied biometrics and econometrics; safety of work in the forest; mechanization and automation of forest operations; classification of soils and land areas; mapping; species introduction; cultivation of forests, resistant to pest infestations; forest pest control, including biological methods; mycorrhiza research; forest hydrology, etc.

There were other two problems in the focus for the Congress: (1) spiral grain, creating specific problems for timber industries and compelling to toughen requirements to forest cultivation and thinning; and (2) development of deciduous stands which could have both positive and negative implications, depending on identified objectives and the ways deciduous wood was developing its typical properties. To address all those problems, specialists of different fields should collaborate. It was the main precondition for research progress, and the IUFRO Congress provided opportunities for collaboration among scientists from different countries and fields of research.

The outgoing President of IUFRO also touched upon its cooperation with the FAO and other international organisations; financial affairs of the Union; named the new President, Vice-President, Members of the Permanent Committee and Section Leaders.

Dr. Jemison from the USA was elected President for the next period (1968-1971), and Professor Ivar Samset from Norway was elected Vice-President.

The following representatives of different countries were elected Members of the Permanent Committee: Professors Melekhov (USSR), Vyskot (CSSR), Campredon (France), Liese (FRG), Holmsgaard (Denmark), Popescu-Zeletin (Rumania), de Philippis (Italy), Srivastava (lndia), Gray (USA), and Doctors Redmond (Canada), Cromer (Australia), Villasenor Angeles (Mexico).

The Section Leaders became Members of the Enlarged Committee: Section 01 Terminology and Bibliography – Mr. Métro (France), Section 02 *Forest History* – Professor Mantel (Germany), Section 11 *Forest Influences* – Dr. Leyton (Great Britain), Section 21 *Research on Site Factors* – Professor Richard (Switzerland), Section 22 *Forest Plants* - Dr. Calaham (USA), Section 23 *Silviculture* - Professor van Miegroet (Belgium), Section 24 - *Forest Protection* - Professor Björkman (Sweden), Section 25 *Growth, Yield and Forest Management* - Dr. Hummel (Great Britain), Section 26 *Forest Recreation and Wildlife* – Dr. Arnold (USA), Section 31 *Forest Economics and Policy* – Professor Hermansen (Denmark), Section 32 *Forest Operations and Techniques* – Mr. Ager (Sweden), Section 41 *Forest Products* – Dr. Fleischer (USA).

In conclusion, the Chairman thanked the outgoing Members of the Committee and Sections as well as the organizers of the Congress, especially, Professor K. Mantel and the University of Munich.

The Congress approved the decision of the International Council to award IUFRO Honorary Membership to Professors V.L. Harper, M. Kreutzinger, E. Saari and J. Speer.

Professor K. Mantel expressed gratitude to the participants of the Congress and IUFRO senior officials. He also said that the participants had got the impression that in Germany, the forests were well tended and thus represented a valuable part of the landscape with important functions for culture and people of the country; it had been prophesied 250 years ago by von Carlowitz, well-known

mining administrator and author of the first comprehensive treatise about forestry: “Forests may be rightfully referred to and regarded as the crown of mountains, decoration of fields, treasure of the country, and joy in combination with profit”; this forest, being a gift of nature, had been cultivated by German foresters during many centuries and would remain a compass of silvicultural cooperation of all nations (IUFRO 1967c, p.292).

Professor E. Lönnroth said that at that excellent Congress, he was the only representative of the older generation of the former IUFRO Presidents as he had been elected in Finland in 1937, i.e., 30 years ago. Unfortunately, his successor Dr. Hans Burger from Switzerland could not attend the Congress due to ill health and the two Presidents, elected after him (Pavari and MacDonald) had passed away. He also noted that it had taken about 75 years for the Union to achieve its glorious summits: at the beginning, its meetings had brought together only 20 to 30 participants though they had been very efficient and famous men; whereas the 14th IUFRO Congress was attended by almost 1,000 fruitfully working scientists with about 10 kg publications in their portfolios; alongside with traditional problems, they addressed interesting things, related to chemistry and physics of the wood which was the main output of silviculture. The large number of printed papers showed what future was to be expected; silviculture was ever developing and expanding: “Our community is a great force; we must and we will stick together for close cooperation and positive work” (IUFRO 1967c, p.293).

Then, the floor was given to D.R. Redmond (Ottawa), J. Parde (Nancy), M. Vyskot (Brno), T.N. Srivastava (Dehradun), R. Villasenor Angeles (Mexico) and M.R.G. Fontaine (FAO). In conclusion, Professor Speer thanked the participants, extended wishes of good weather to those who intended to take the study tours or return home and declared the Congress closed. It seems appropriate to quote J. Speer here: “At such a Congress, our business is to discuss, share opinions, be engaged in battles of ideas in order to acquire impetuses for generation of new and better ideas and for progressive development” (IUFRO 1967c, p.300).

Resolutions

No specific resolutions were adopted. It was decided against increasing the number of sections and, instead, for dividing the existing sections into independent working groups to prepare the Union for future restructuring. As noted by President Speer, IUFRO’s goal was not to conduct studies on its own, but to develop contacts between scientists to share experience and results of research in its member organizations.

Excursions

The provisional itinerary and contents of the tours were drafted and disseminated together with the overall Congress Agenda in October 1966, and on January 31, 1967, the plan of the tours was prepared in German, English and French and disseminated by the Congress Secretariat to member organisations and other stakeholders. The program included 17 technically and regionally focused excursions for 1 to 14 days each through the Federative Republic of Germany. The registration deadline was May 1, 1967. On May 23, 1967, it was decided to offer 10 tours instead of 17 because the number of delegates was not sufficient though their numbering remained unchanged.

The excursions were attended by 308 delegates and accompanying persons from 35 countries (without the tour guides, their assistants and interpreters – all provided by the hosts). The number of participants of each tour ranged from 20 to 35 people. The tours followed the offered program and were provided with descriptions/explanations in German, English and French; Tour # 11 was provided with descriptions/explanations in Russian.

All the tours also enabled the participants to enjoy the beauty of the rural landscapes and cultural monuments, and, some excursions offered such events as organ recitals, visits to authentic

villages and parties theirs, wine tasting, etc. Forest owners and managers of timber companies were very generous and hospitable hosts. In addition, during the excursions, the forest management administrations, forest owners, forest managers and others voluntarily offered their assistance to the excursion guides. A detailed description with maps and statistics was provided for each excursion.

Route 1. Growth of forest stands. Leaders: Professor E. Assman and Professor G. Mitscherlich. Dates: September 10-15, 1967/6 days/29 delegates from 18 countries. The tour was designated to show sample areas, established to monitor the growth of tree stands. In the Partenkirchen Forest District, Professor Magin told the group about a series of sample areas in natural stands in the zone of mixed forests in the hills of Wetterstein. The sample areas had been monitored for 15 years; and during the excursion, they were used as examples to explain the three typical structural stages in the development of virgin forests. In the Sachsenried and Denklingen Foest Districts, a series of sample plots was demonstrated to show the growth of spruce trees. That series of sample plots was well-known owing to Professor Assman's numerous publications about the longest observations in Europe to monitor thinning outcomes: *Informationen über Wachstum und der Ertrag Fichte Auf Optimal Standorten Des Voralpengebietes* (Information about spruce growth and stock in optimal site conditions in the foothills of the Alps).

In the Ochsenhausen Forest District, Forest Foreman Hauser showed sites of experiments with drainage and fertilizers in spruce stands in complicated areas with predominance of old moraine soils; and in Biberach, the group saw thinning experiment sites. Chief Forester P. Abetz told them about his experiments with thinning in spruce plantations in the Riedlingen Forest District and about various methods to improve the efficiency of thinning in dense young stands at the pole stage. He also informed them about various methods of planting large-sized seedlings with a wider spacing. During the visit to well-known sites of experiments with selective cutting, located in the Freudenstadt and Wolfach Forest Districts, Professor Mitscherlich highlighted methodological aspects of forest yield comparisons between the selection and high forest systems where selected areas were set aside for cutting, and underlined the importance of long-term observations both for selective cutting, depending on the growing stock, and for environmental studies. During the visit to the Uhlberg experiment site in the Freiburg Municipal Forest District, the focus was on environmental issues of forest yield. Professor Mitscherlich informed the participants about environmental research in pure and mixed stands and demonstrated its results, showing numerous diagrams and tables.

Route 4. Timber harvesting and transportation. Leader: Professor G. Steinlin. Dates: September 10-15, 1967/6 days/33 participants from 15 countries. The excursion was meant to show the process of timber harvesting in Baden-Württemberg as well as to demonstrate studies, undertaken by the Institute of Forest at the University of Freiburg[189]. Timber harvesting processes were discussed in the context of cutting small-sized trees in coniferous stands in Konigseggwald and deciduous species in Pfronstetten where the wood, supplied for pulp and paper industries, was measured through scaling at the mill. The delegates visited the pulp mill where they saw and discussed wood-processing. In Forbach II, the demonstration covered all forest logging operations, including harvesting of coniferous wood in midland areas, skidding on steep slopes, testing of tractors through their use in forest operations, methods to measure heat and vibration of forest machines as well as training in schools of forestry and in the field.

Route 5. Wood-working. Leader: Professor F.Kollmann. Dates: September 11-15, 1967/5 days/31 participants from 15 countries. The aim of the excursion was to show one of the best wood-

[189] Most likely, it was the Institute of Forest Utilization and Work Science of the Albert-Ludwigs-University in Freiburg in Breisgau.

working enterprises and wood supply management. The delegates saw several well-equipped facilities and discussed manufacturing of high-quality wood products, ranging from masts to parquet floorboard with the possibility to switch to a secondary industry, e.g. manufacturing of reinforced concrete masts in the same facility. During the visit to a major German machine-building company, it was demonstrated how a vehicle, e.g., a car could become comfortable and pleasant owing to its wood-tone trim with comparatively moderate quantities of wood used for this purpose. The group visited a facility, manufacturing school furniture and were familiarized with high-tech wood-processing methods and prospects for their further development. In the parquet floorboard manufacturing facility, the participants saw up-to-date fully mechanized production lines for parquet bar and inlaid flooring. In the manufacture of wooden beer barrels, they saw coating equipment for preserving oak barrels with the help of permanent synthetic coating in order to sustain their competitiveness in the market where steel and aluminium barrels were trying to replace them. In conclusion, the largest German paper-making machine, designed in 1962, was demonstrated. Special attention was paid to capacious basins for storage and washing of fresh wood. It was particularly interesting to see after the visit the top plant, manufacturing paper-making machines and was an example of cooperation between the research community and the community of practice.

Route 6. Mountain Silviculture and Agriculture. Leaders: Professor F. Backmund and Professor H. von Pechmann. Dates: September 10-14, 1967/5 days/37 participants from 14 countries. The tour was meant, primarily, for participants from non-European countries to show them how forests were growing and managed in the Bavarian Alps and in foothill areas. At the point of visiting several stands in the gravel plain near Munich and several forest experiment areas with optimal growth in the suburbs of Traunstein, Routes ## 6 and 11 were merged because the Lead of the Tour # 11, Professor J.N. Köstler had been working in that forest for 20 years. The tour included an introduction into the forestry practice in the difficult Alpine terrain with poor accessibility of the forests. The group visited rural Berchtesgaden and boated across Lake Konigsee. That part also gave rise to an interesting discussion about forest development in the high Alps both from the scientific and historical perspective, touching upon the history of saline land management, hunting and nature conservation. The participants discussed the relationships between forests and pastures as well as close links between agriculture and forestry as exemplified in Berchtesgaden. The process of forest removal was demonstrated in Werdenfels, and site-specific skidding with the help of a cable winch was demonstrated in the Murnau Forest District. Studies of Munich Institute of Silviculture were used to show selective cutting practices in farms in Allgäu.

Route 7. Soil Fertility and Agroforestry. Leader: Professor J. Wehrmann. Dates: September 11-13, 1967/3 days/35 participants from 16 countries. The objective was to show the effectiveness of applying fertilizers, seeding lupine under the canopy, cultivating the soil after grazing and litter removal. On the way from Regensburg through Waldsassen to Bodenwöhr, the Tour Lead provided a historical overview about cattle grazing and manure and forest litter management. The group saw earlier used equipment and practices of manure management, but became irrelevant at present. Two neighbouring plots illustrated problems, related to collection of manure and forest litter, with their results clearly adversely affecting in the soil and yield of tree stands. The increment suffered primarily from the deteriorated nitrogen nutrition for the trees. Then, the hosts demonstrated the ways to reduce or eliminate the negative consequences of grazing, litter removal and manure collection in the forests through tilling the soil, seeding the lupine or other plants, applying fertilizers or using a mix of such methods. A comparison showed that the effective way was to use nitrogen fertilizers.

Route 8. Breeding and Genetics. Leader: Professor Rohmeder. Dates: September 11, 1967/1 day, 24 participants from 10 countries. The objective was to show the results of 10-year experiments in Grafrath. The first part of the tour included a visit to a forest nursery and demonstration of

technical aspects of forest resource renewal; and the second part highlighted genetic and hybridization aspects of provenance studies.

Route 9. Poplar and Willow Breeding and Cultivation. Leader: Professor Rohmeder. Dates: September 12-13, 1967/2 days/26 participants from 9 countries. The objective was to show the importance, propagation, cultivation and silvicultural treatment of poplars and willows in Southern Bavaria. The tour demonstrated stands of white and silver poplar (*Populus canescens*) trees at different ages near Ingolstadt where the participants discussed provenance, uses, vegetative propagation, clone selection and yield of this poplar species. During the visit to a private tree nursery, cooperating with the Munich University for a decade, sites of experimentation with poplar and willow propagation were demonstrated with detailed clarifications about cultivation of elite species of the willow and poplar through hybridization. In particular, various methods of black poplar cultivation were demonstrated in a private forest in the mouth of the Isar River; in the same forest, the group saw young stands, aged one year, and old growth of the black poplar as well as European/American hybrid poplar (*Populus euramericana* cultivar *brabantica*) which remained healthy (without any signs of canker) though they had been growing for a long period of time as evidenced with the impressive volumes of the growing trees.

Route 11. Bavarian Forestry. Leader: Professor J.N. Köstler. Dates: September 10-16, 1967/7 days/35 participants from 18 countries. The aim of the tour was to provide a general insight in Bavarian forestry, to discuss existing problems in silviculture and forest management, and to inform the group about research activities of the Munich Institute of Silviculture at the Munich Technical University (Technische Universität München) and about academic training through seminars and practical/field studies. The tour went through an extensive part of Bavaria. The group visited 12 forest districts and could compare different forests and sites: Bavarian flatland forests in Franconia; forest drainage sites in Upper Palatinate; oak stands, managed for plywood in highland Spessart; forest landscapes on moraine soils in Steigerwald. They saw how forestry tasks were addressed, e.g., reforestation in Traunstein; operation of machinery in Bodenwöhr; combination of species for reforestation in Steigerwald; oak plantations in Spessart; thinning of stands with various tree species and stand structure. The identified most noteworthy tasks were such forest management activities as planning, increment and growing stock regulation and forest mapping. The participants of the trip continued to discuss forest management issues. The cornerstone of the discussion was a synthesis of various forest properties; therefore, the discussion was focused on how to sustain forest revenues, protect and improve soils, improve forest yield, increase timber outputs of high-value species, foster landscapes and enhance recreational benefits of forests. It was emphasized that some courage would be required to articulate such goals and respective research programs because such efforts were constrained with specialization though, on the other hand, it was also necessary to focus on scientific synthesis of multiple areas of knowledge. The delegates received a list of 100 books and articles, chosen from the publications of the Munich Institute of Silviculture, characterizing its plans and reflecting its activities, completed in the demonstration sites.

Route 12. Silvicultural Practices. Leader: Professor Schmidt-Vogt. Dates: September 10-15, 1967/6 days/20 participants from 12 countries. Its objective was to show the whole of range of silvicultural practices, depending on the status of the forests, site condition and objectives of forest management in well-structured areas such as Baden-Württemberg. It was also intended to demonstrate the dual nature of silviculture: (1) some conditions and aspirations might require silvicultural measures with the use of so-called up-to-date silvicultural technology while (2) other conditions and goals might build upon more conservative methods which were perceived as ‘classical’ silviculture. E.g., the tour enabled to compare: (i) a thinning pattern for pure spruce stands in Riedlingen and fully mechanized establishment of pine plantations in Karlsruhe; and (ii) reconstruction of mixed beech/spruce/fir stands in a selection forest in the Freudenstadt resort and

recreation area. A broad range of examples provided a basis for discussing such peculiarities as the importance of seed provenance studies for security of using spruce forests for snow trapping in the midland areas of Schwarzwald, especially in the beginning of trials; transformation of pure spruce stands, suffering from frequent windbreaks, into mixed forests on the basis of mapping of site conditions in the vicinity of Lake Bodensee; history of the evolution of forest plantations in Villingen; environmental review of experiments with different practices of group/selective cutting to assess natural regeneration in beech/spruce/fir stands in Schwarzwald; requirements to the size of planting stock for stand establishment in various combinations of commercial and recreational forests in Freudenstadt; fertilization of forests in Schwarzwald; resistance to insect damage and insect pest control in Schwetzingen.

Route 17. Forest Economics. Leaders: Professor K. Mantel, Professor Speidel and Assistant Professor Hildebrandt. Dates: September 10-17, 1967/8 days/37 participants from 13 countries. The tour objective was to provide an overview of forest economy in West Germany. The route went through forests of various types between the Alps and Lüneburger Heide. Its participants discussed current issues of forestry and agriculture as well as economic problems of private, communal and national forestry. The provided overview linked historical development, scientific knowledge accumulation, economic indicators and forestry objectives. Great differences in site conditions necessitated different measures and it was demonstrated in in mixed Alpine forests; mixed stands in Salem; fir, spruce and pine stands on the border of Baar; in Schwarzwald with its selection system of forest management; in Odenwald with its coppice system; oak stands in Spessart; urban forests in Frankfurt; afforestation of peatland and wasteland in Ruhr, an industrial area; beech forests in Weser; pine forests in Lüneburger Heide. The excursion was focused on forest economics and policies. The discussion about policies was centred at planning of national efforts to establish a green belt and link it with nature conservation and taxation issues. The Visit to the Ruhr Area gave rise to a discussion about land use planning and intensive landscape rehabilitation; the visit to forests near Frankfurt enabled to discuss natural regeneration aspect; and during the visit to Saupark in Springe, the group saw some of the German game species (wild boar). The social program included receptions, hosted by the Munich Mayor (September 4, 1967), the Association of German Research Institute (September 5, 1967), and the Prime-Minister of Bavaria (September 6, 1967). There were also special events such as Bavarian Evenings (September 5, 1967) or a ball (dancing party) in the Palace Hotel Regina (September 8, 1967). The ladies' program was offered for spouses and family members of the delegates and included a visit to a garment factory (September 5, 1967), a bus tour to Chiemsee or to Oberammergau to admire church-owned meadows and royal castles (September 7, 1967). In addition, a specialty evening tour was offered (September 6, 1967) to visit the Alte Pinakothek[190] in Munich with a guided tour in German, English and French.

Soviet/Russian participation

At that Congress, the USSR delegates: Professor I.S. Melekhov (MLTI), Professor P.V. Vasilyev (VNIILM), and E.S. Pavlovskiy (USSR State Forestry Committee) presented papers. According to the IUFRO Congress documents, Professor I.S. Melekhov from the USSR presented his paper about dynamic forest typology at the meeting of Section 23 on September 7, 1967 (IUFRO 1967c, p.198) [191]. In the Report of Section 31, prepared by its Leader Niels K. Hermansen, it was

[190] A European Medieval Art Gallery.

[191] Prof. I.S. Melekhov from the USSR also sent us a paper: *Dynamic Forest Typology*. Due to a technical error that paper was not included into the Proceedings of the 14th Congress. It is added to the archives of Section 23.

said: “Papers by E.S.Pawlowski of Poland[192] (about forest shelterbelts on black soils in Kammenaya Steppe), and by Professor P.W.Wasiljew of U.S.S.R. (about setting standard costs in forestry in the USSR), were submitted to the Section in addition to published papers” (IUFRO 1967c, p.233). The Program of the Congress also included a paper of A. Livanov (about techniques and technology of logging in mountain forests of the USSR) to be presented at the meeting of Section 32: (IUFRO 1967a, p.52), but he did not participate in the Congress.

The Congress documents contained a list of forest pest and disease specialists which included Soviet scientists: V.P. Belkov, L.M. Kozlova, I.V. Shutov from the Leningrad Forestry Research Institute, and P.A. Samgin from the Leningrad Institute of Plant Protection (IUFRO 1967b, Vol. V, p.661). As for descendants of the Russian Empire and Soviet Union, the Congress was attended by abovementioned V. von Butovitsch (Sweden) and V.S. Tregubov (Yugoslavia) as well as entomologist Dr. Joseph Galperin (Israel), born in Belarus, and entomologist Klaus Maximov (Birmensdorf, Switzerland) who submitted a paper[193] to Section 24.

Interesting facts

The Congress made an important change in the name of the Union. In the English version, the word *Forest* was changed for *Forestry* which significantly limited the scope of IUFRO activities to the detriment of timber industries. Its name in Russian remained unchanged.

More than 20 years had passed after World War Two, but there were no direct flights between Moscow and Munich; so the Soviet delegation took a flight of the USSR Aeroflot airlines to Berlin, and a flight of the British Airlines to Munich. On the way back, they flew by the American Airlines.

[192] E.S. Pavlovskiy was erroneously listed as a representative of Poland (IUFRO 1967b, Vol. VIII, p.233).
[193] Maksymov, J.K. The outbreak of the Nun Moth (*Lymatria monacha L.*) in Switzerland (IUFRO 1967b, Vol.V, p.681-682).

Chapter 20
Congress XV- March 14-20, 1971, Gainesville, USA

This section draws from the Proceedings of the 15th IUFRO Congress (IUFRO 1971), as well as papers of the Congress participants (Мелехов, Моисеев, Коломиец 1972).

Overview

The 15th Congress was the first Congress, held outside of Europe – in North America. It was also the first Congress, held in March, instead of the traditional month of the IUFRO Congresses – September; 681 delegates, including 318 from the United States of America and 363 from other 57 countries attended the Congress[194].

It was for the first time that the Congress included *World* in its title, and all the subsequent Congresses will be called the *IUFRO World Congress*. It was the first Congress which had a motto; that time, it was: *The Role of Research in the Intensification of Forestry Practices and Activities* (IUFRO 1971, p.62).

In this context, it would be interesting to compare IUFRO and FAO Congresses: "Both IUFRO Congresses and World Forestry Congresses provide lots of valuable knowledge, enabling to assess the global development levels in various areas of forest science and practice and contributing to the acceleration of progress in science and technology, in general; at the same time, the participation of our scientists increases the visibility of the country's achievements in various fields of forest science" (Мелехов и Моисеев 1982, p.130). For a long time, the participation of our scientists in international events and activities tended to depend on the financial situations of their organisations.

The IUFRO Congress was attended by representatives from seven international organisations: United Nations Educational, Scientific and Cultural Organization (UNESCO), Food and Agriculture Organization of the United Nations (UN FAO), International Academy of Wood Science (IAWS), International Union of Societies of Foresters (IUSF)[195], International Union for the Conservation of Nature (IUCN), International Union of Game Biologists (IUGB), and the World Wildlife Fund (WWF). Its agenda included 5 sessions, 424 presentations and 4 excursions.

In his report to the Congress, the IUFRO President noted that the number of IUFRO Members had increased from 183 in 1968 to 233 in 1971, or by 30%, and the number of its Associated Members increased from 5 to 15, or 3 times. In addition, none of its member organizations had left the Union. During that period, new IUFRO members had come from such countries as Zambia, Iceland, Cambodia, Colombia, Cuba, Paraguay, Rhodesia, Uganda, Fiji, and the Philippines. So, the number of countries, represented in the Union, had reached 60. It is worth to note that in 1972 (next year), IUFRO had already 267 member organizations in 68 countries, uniting 7,000 scientists (Speer 1972).

"The Congress paid much attention to such important up-to-date problems as increased forest yield, multifaceted significance and multiple use of forests; relations between Man and Nature and enhanced role of the forest in these relations; genetics; long-term planning and development of forestry, its changing goals in the era of industrialization and urbanization" (Мелехов, Моисеев, Коломиец 1972, p.169).

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[194] According to E.T. York, there were 771 scientists from 57 countries (IUFRO 1971, p.282). Perhaps, this number included also accompanying persons.

[195] The IUSF was established in 1960 to promote and support professional forestry societies around the world.

Scientific program

At the plenary session of the Congress, a keynote address about forestry research and human environment was delivered by Dr. E.B. Worthington, Scientific Director, International Biological Program (IBP), London [196]. He reminded that there were two contrasting values in forestry: protection and production. He criticized those who 'worshipped' the gross national product, and suggested that developing countries should be guided away from maximum product and towards maximum employment. Talking about multiple forest use, he stressed the need to identify the key objective for each parcel of land and to apply a system of zoning.

Dr. E.B. Worthington also told the audience about the IBP and its relevance for forest research. He emphasized that the IBP had created "a spirit of cooperation among environmental biologists of the world". He also said that within the woodland theme, the IBP listed 109 projects, contributed by 30 countries, with 50 out of the 184 IUFRO member organisations, "conducting research either within the IBP or on directly relevant problems". Among such projects, there were "a Belgian study in oak woodlands; in Finland, studies of spruce forest; in Japan, comprehensive research on a number of forest types; in Poland, on oak hornbeam forest and beech forest; in United Kingdom, a rather comprehensive study of Methop wood in the Lake District (which is oak dominated); and in USA, an ambitious series on deciduous and coniferous ecosystems". He gave a few examples of the topics, covered by IBP meetings: "functioning of ecosystems at primary, secondary, and tertiary levels of production; soil ecology; productivity in root systems; biological control of pests; exploration, utilisation and conservation of plant gene resources; conservation of areas as nature reserves and national parks; bioenergetics end tropical ecosystems; photosynthesis. He concluded his speech with the following three points: "1. Let us think out clearly the objectives before embarking on research projects. In other words, ask the right questions in order to obtain the right answers. 2. Let us consider the forest as a whole - its vegetation and fauna, its soil and water regime and the water bodies in its catchment area· as a system of energy flow and biological productivity, of which mankind is a part. 3. Let us focus new attention on changes in the forest environment, both natural and man-made; how to assess them and how to influence them towards a better partnership between man and nature" (IUFRO 1971, p.26-31).

The scientific program of the Congress included 12 papers to be presented at the plenary sessions and to cover key issues of the current development of forest science, including forest management, recreation and forest protection, reforestation and remote sensing methods for research, mechanization, etc. The Congress included the work in 11 Research Sections where a wide variety of papers were presented.

Section 01 *Bibliography and Terminology* (Leader: Métro, France) continued to discuss the preparation of the *Multilingual Forest Terminology* which had begun as early as in 1949. The English version of the Multilingual Forest Terminology was published early in 1971, owing to financial support from the USA and Canadian Forest Services through the Society of American Foresters. Additional copies of the English Terminology might be purchased at US$ 10. It should be mentioned that the French version was published in 1975, in 1980, it was published in Italian, and the *Vocabulary of forest management, containing* over 1,800 terms, was published in 1990 in six languages (English, French, German, Italian, Russian and Spanish) as a "comprehensive technical glossary for foresters, scientists, and students interested in forest management" (Unasylva 1991).

At the Section, six volunteer papers were informed about the development of agricultural and forestry bibliography in Romania (T. Balanica), France (R.C. Tomassone and R.E.T omassone,

[196] The Program was implemented in 1964-1972 and, then extended till 1974; the successor of the program was the UNESCO Man and the Biosphere (MAB) Program.

France), Great Britain (T.B.Yerke, USA) and Western Europe (W.C. Berges, USA), and on the international forest information systems[197] and mechanized storage and retrieval of specialized literature (both papers by G.Namkoong, USA).

Section 02 *Forest History* (Leader: Professor Mantel, Germany) followed its aim to prepare complete national forestry bibliographies. In particular, it was reported about the publishing of Part II of the German Forest Bibliography, covering the years 1560-1965. It contained 639 pages and 6,330 titles of books and other writings on forestry and forest industry that were under head titles 7 and 9 of the Oxford Decimal Classification. The second part contained an index of forestry periodicals, reports of societies and meetings, yearbooks, communications and leaflets. In addition, it listed old forest and timber ordinances (from the 16th century up to the first half of the 19th century), published as separate issues. The second part also included a broad supplement to the first part, listing the titles of main groups 0-6 of the Oxford Decimal System (IUFRO 1971, p.229). The third part was expected to be issued in 1972[198]. A volunteer paper to highlight the 150th anniversary of the *Sylwan* Polish Journal was presented (S.Tyszkiewicz and W.Grochowski, Poland)[199].

Section 11 *Forest Influences and Watershed Management* (Leader: Dr. Leyton, Great Britain) held four sessions. At the first session, the participants heard one paper and watched a film about the role of forests in avalanche control in Switzerland (H. In der Gand, Switzerland). At the other three sessions, 16 papers were presented: one from Austria (G.Kronfellner-Kraus, about torrent checking dams) and 15 papers from the United States. The papers reflected theoretical and practical experience in addressing various issues, ranging from hydrology (J.E.Douglas and J.D.Helvey; J.W.Hornbeck and R.S.Pierce), slash burning in larch-Douglas forests (P.E.Packer), release of water from forest snowpack (H.F.Haupt), radiation balance (D.R. de Walle; I.W.Swift and K.R.Knoerr), evaluation of weather modification on ecology (H.L.Teller), watershed research (C.M.Skau and J.H.Humphrey), use of wastewater as a fertilizer (W.E.Sapper), stream contamination, resulting from the use of herbicides on forest lands (L.A.Norris) and the use of forest plantations to reduce noise from transport (O.F. Van Haverbeke and D.I.Cook). There was one volunteer paper of V.N.Serafimov (Bulgaria).

Section 21 *Research on Site Factors* (Leader: Professor Richard, Switzerland) had productive discussions in six out of the seven working groups (WG) meetings. There were five volunteer papers presented at the WG on Fertilization of Forest Soils about: factors, affecting fertilizer experiments with large trees (M. Bonneau); year-to-year variations in nutrient content of foliage and their importance in interpretation of foliar analysis (F.H. Evers, Germany); effects of season of fertilizer application on growth responses (F.J. Fiedler, DDR and G.F. Weetman, USA), factors affecting the duration of growth response to fertilizer application (E.C.Steinbrenner, USA), etc.

The *WG on Water Regime and Aeration* in Forest Soils received two papers: one with the same name as WG title (N.Linnartz, USA), and the other was titled *the direct method of determining water content and pressure head in unsaturated soils* (L.W. De Backer, Belgium).

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[197] The IUFRO Working Group for the development of such a system (GFIS/Global Forest Information Service) was established only in 1998 (Paivinen *et al.* 1999), and in Russia, its regional centre was put in place at the Moscow State Forest University (for more information, see Chapter 9).

[198] Mantel, Kurt von (1967) Deutsche forstliche Bibliographie, 1560 – 1965: Mit einer Einleitung Entwicklung der forstlichen Literatur in Deutschland vom Ende des Mittelalters bis zur klassischen Zeit. – Freiburg im Breisgau (Universität, Forstgeschichtliches Institut; Hannover Schaper in Kommission). – Freiburg/Breisgau : M. und H. Schaper, 1967-1972. – Tl. 1-3: Teil 1. Mit einer Einleitung: Entwicklung der forstlichen Literatur in Deutschland vom Ende des Mittelalters bis zur klassischen Zeit, 1967, xlviii, 578 S. (in co-authorship with Hauff, Dorothea); Teil 2, 1970, 639 S.; Teil 3. Registerband, 1972, 327 S.

[199] The Journal was established in 1887 (Krajewski 1992, p.21).

The *WG on International Comparison of Methods for Chemical Analysis* received one volunteer paper, prepared by scientists from the Netherlands (C.P.Van Goor, M. de Wit, J. van den Burg).

The *WG on Quantitative Studies of Site Factors and their Influence on Growth of Stand* discussed 19 papers on the influence of site conditions on growth and development of tree species as radiata pine (*Pinus radiata*), Norwegian fir (*Picea abies*), black alder (*Alnus glutinosa*), Douglas-fir, black spruce (*Picea mariana*), Sitka spruce (*Picea sitchensi*), western hemlock (*Tsuga heterophylla*), fir and spruce in Newfoundland, Canada, pine in South Australia, etc. Other papers reported about assessments of site conditions (E. Bakuzis, USA); correlation and multiple factor analysis; quantifying the problems of site conditions (R.Ballard, D.S. Jackson and G.M. Will, USA), nutrition of Norway spruce (*Picea abies*) by W.E.Blum, Germany, ecology and productivity in a tropical rainforest (E.F. Brünig, Germany), quantitative study of site factors and site evaluations (S.P. Gessel, USA; F.Le Takon and C. Miller, France; A.N. Lewis, Australia, D. Mader, USA), etc.

The *WG on Plant Physiology as Related to Site Factors* had 10 papers; eight of them were from the USA, and one from Germany and one from Italy. The main topics were production processes in relation to the photo- and thermal periods; atmospheric and other environmental factors; optimal nutrition of plants (pine, spruce, poplar, etc.) and genetic differences of nutrient use in loblolly pines (*Pinus taeda*). Two papers about research in British Columbia, Canada, were discussed at the *WG on Ecology and revegetation of sites with adverse soil conditions* – one showed the importance of institutional and environmental factors for formulation of a policy for reclamation of mined lands, and the other one demonstrated progress in reclamation research during 1970. Three additional volunteer papers were about site management (R.F.Faro, Hungary), forest fertilizers in the North-western United States and Western Canada (R.F.Strand, USA), and use of needle colour in Predicting Growth and Response to fertilization (O. Luukkanen, USA).

Section 22 *Study of Forest Plants* (Leader: Dr. R.Z.Callaham, USA). During the Congress, nine WGs of this Section held 19 meetings, including three joint meetings with Section 24 and one meeting with Section 41. Altogether, 85 papers were submitted for discussion.

The *WG on Classification; Characteristics in Natural Stands; Gene Resources* heard 7 papers about studies, related different pines, their seeds and needles. In particular, Professor J. Burley submitted 3 papers with two of them, prepared jointly with co-authors: (i) I.A. Andrew, P.M. Burrows and (ii) G.A.R. Howell, out of the 4 papers about *Pinus kesiva Royle* ex Gordon (= syn. *Pinus insularis* Endl.), widely spread in tropical countries. This species and another pine (*Pinus merkusii* Jungh) were described in 2 papered, prepared by J.W. Turnbull.

The *WG on Plantation Performance; Physiology* discussed 20 papers. They were focused on seed provenance; Growth and morphogenesis of different pines (*Pinus caribaea, P.merkusii, P.kesiya*, etc.) in natural forests and in plantations in Africa (Ivory Coast, Nigeria), Central and South America (Argentina, Brazil, Venezuela, Puerto-Rico, Jamaica), India (Bengal, Uttar Pradesh), sub-tropical Australia; and implementation of international projects, including FAO projects.

The *WG on Breeding to Improve Populations* received 16 papers, mostly, about pines, including both theoretical and practical perspectives, and proposals on international cooperation (D.G. Nikles).

The *WG on Wood Properties* held its meeting jointly with Section 41. The 9 papers covered various studies and ranged from: a review of wood quality of *Pinus merkusii Jungh. et de Vriese*, prepared by I.A. Andrew, and summary report on variation of wood quality of *Pinus merkusii Jungh et de Vriese*: five trees of Burma provenance grown in Zambia, prepared by the same author together with J. Burley; wood structure of *Pinus caribaea* in relation to use characteristics, growth conditions and tree improvement (J.F. Hughes); density variation in *Pinus caribaea Morelet*, grown in Jamaica (G.A.B. Brown); *Pinus caribaea* potential as a pulpwood (E.R. Palmer and C.B. Tabb) to utilization of exotic conifers in Zambia (A.D.K. Hardie and C.L. Ingram.

The *WG on Quantitative Genetics* had two sessions: (1) genetic divergence among forest tree populations (J.P. King, USA, Chairman) and (2) advanced generation breeding populations (G.Namkoong, USA, Chairman); with 12 papers presented: Breeding Plans for Forest Trees in Sweden (E. Andersson, C. Ehrenberg, H. Hattemer, Sweden); Breeding Populations for Recurrent Selection - Current Dilemmas and a Possible Solution (R.D. Burdon and C.J.A. Shelbourne); Techniques for Evolutionary Studies of Forest Trees (J.W. Hanover, USA); Developing Advanced Generation Breeding Populations for a Hybrid Breeding Program (S.K. Hyun, Korea); Selection and Mating for Production of Second Cycle Populations for a Jack Pine Breeding Program in Western Canada (J.I. Klein, Canada); Use of Normal Probability Paper in Consideration of Delineating Groups of Provenances (H.F Kung, USA); Use of Population Variance in Selection for Forest Tree Improvement (H.F Kung and A.E Squillace, USA); Cone Serotiny in Pitch Pine (F.T Ledig, USA); Stability Parameters in Provenance Selection (E.K. Morgenstern and A.H. Teich, Canada); Alternatives and Restrictions in Selection of Mating Designs for Advanced Generations of Tree Breeding Populations (G. Namkoong, USA); Gene Frequency Patterns of Monoterpenes in Slash Pine (A.E Squillace, USA); Second Generation Breeding Plans for White and Red Pine in the Lake States (J.W. Wright, J.W. USA).

The *WG on Reproduction* had 13 papers, including two papers, presented by representatives of the USSR (G.M. Kozubov and T.P. Nekrasova, see below). The highlighted such aspects as ontogeny; dormancy of conifer seeds; embryo maturation in *Pinus peuce***;** embryonic lethal and empty seeds in *Picea abies* and *Pinus silvestris*; intraspecific variation in nuclear characteristics of Douglas-fir; seed production in a *Pinus radiata* clonal replication, etc.

The *WG on Genetic Resistance to Forest Insects and Diseases* had a joint meeting with Section 24; the presented papers were: Procurement of Douglas Fir Seed for Provenance Research (H. Barner, Denmark); A Proposed International Program for Testing White Pine Blister Rust Resistance (R.T.Bingham from the USA and J.Gremmen from the Nertherlands); Possibilities of Forecasting Damage by Internationally Dangerous Diseases and Insects (R.W.Brandt, USA); The Netherlands Report on Elm Breeding (H.M.Heybroek, Netherland); Some Proposals for Breeding Weevil-Resistant White Pine (J.P. King, USA), etc.

Additional papers, presented for the consideration of Section 22, not listed elsewhere were: Growth Substances in Relation to Rooting Ability of Cuttings (S.K. Hyun, and S.O. Hong, Korea); Current Position and Plan for the International Provenance Trials with *Pinus contorta* (R. Lines, Great Britain); Research in Silviculture of Coppice in Morocco; Experience Already Acquired and Problems Investigated (A. Riedacker, Morocco).

Section 23 *Silviculture* (Leader: Professor van Miegroet, Belgium) discussed the following reports of its WGs: Afforestation in arid and sub-arid zones; Afforestation of peatland and extremely wet soils; Characterization of forest plants; Spacing trials; Treatment of young stands; Tropical silviculture; Use of herbicides. Thirteen volunteer papers were presented on different topics from direct seeding of Scots Pine/*Pinus sylvestris* (F. Bergman, Sweden) and long-term thinning research on Scotch pine (S.O.Andersson, Sweden) to drainage norms and regeneration methods used on peatland (L. Heikkurainen, Finland), afforestation in arid zones (J. Kaplan et al., Israel) and degradation of herbicides in the forest floor (L.A. Norris, USA).

Section 24 *Forest Protection* (Leader: Professor Björkman, Sweden), held a number of meetings of its WGs. E.g., the *WG on International Cooperation in Forest Disease Research*, chaired by R.W. Brandt (USA), held four sessions: (1) biological control of forest diseases; (2) scleroderris; (3) relationships between site, tree diseases, and forest insects (jointly with the WG on International Cooperation in Forest Insect Research); and (4) genetic resistance to forest diseases and insects (jointly with Section 22). The meeting heard and discussed 22 volunteer papers,

reflecting problems, faced by many countries, including Austria (E.Donaubauer), Canada (D.E.Etheridge and many others), Japan (K.Ito), India (B.K.Bakshi), Korea (Yi Chang-keun), Netherlands (J.Gremmen), Norway (F.Roll-Hansen), and USA (D.C.Marks and many others).

The *WG on International Cooperation in Forest Insect Research* chaired by R.W.Stark (USA) covered five different topics on (1) integrated control of insects; (2) population dynamics research; (3) resistance and natural control; (4) joint meeting with disease research; and (5) genetic resistance (joint session with Section 22).

The meeting informed its participants about the cooperative studies, organized on the larch bud moth (*Zeiraphera diniana*) in Europe, on the large pine weevil (*Hylobius abietis*) in the Nordic countries, and on the pine processionary caterpillar (*Thaumetopoea pityocampa*) in the Mediterranean region. A new Working Party (WP) was set up by R.T.Cora (USA) and P.Grimpja (Costa Rica) to address the mahogany shoot borer (*Hypsipyla grandella*) which was one of the first tropical insect, put on the IUFRO agenda.

In addition, 26 volunteer papers, including six papers from the USSR, were submitted to the WG meeting. The papers covered bark beetle problems (S.Barras et al.; F.W.Cobb *et al*.; W.E.Cole; J.P.Vite – all USA; C.I.Vassechko, the USSR), insect population dynamics (J.Riom, France; C.V.Stadnitskiy, the USSR; J.P.Kimmins; W.J.Turnock – both Canada); pest insect attack (D.F.Rudnev; D.F.Rudnev and R.I.Zemkova; V.P.Smelyanets – all the USSR); pest control (R.W.Stark, USA; J.H.Ko, Korea) and others.

The *WG on Mycorrhiza* research discussed the need for accelerated studies of endomycorrhiza and made plans for increased cooperative work. This WG voted to accept the terminology proposed by B. Peyronel et al. (1969) as follows:

A. Ectomycorrhizal to replace Ectotrophic Mycorrhiza;

B. Endomycorrhiza to replace Endotrophic Mycorrhiza;

C. Ectendomycorrhiza to replace Ectendotrophic Mycorrhiza.

“Pseudomycorrhiza” was not included as an accepted term.

The new terminology was to be included in the official terminology listings of IUFRO as synonyms for the old Terminology. The WG received 19 volunteer papers from Australia, Czechoslovakia, Finland, India, Italy, Nigeria, Pakistan, United Kingdom, and the USA, which demonstrated the high interest to this problem.

The meeting of the *WG on Fume Damage*, chaired by E.Donaubauer (Austria), discussed how to identify and assess air pollutants, causing damage to forests. Many of the following papers, along with a directory of workers engaged in air pollution research had been published before the Congress: *Methods for identification and evaluation of forestry harmful air pollutants*. Working Group on Fume Damage of Forests of IUFRO section 24 (Methoden zur Erkennung 1971).

Additionally, 12 volunteer papers were submitted to this WG to present efforts in the following areas: air quality criteria (W.Knabe, FRG), symptomatology of fume damage of conifers (G.Halbwachs, Austria) and broad-leaved forests (L.S.Dochinger, USA), symptoms and measurements of photochemical air pollution (two paper by A.C. Constonis and S.N.Linzon, Canada) and damage caused by heavy metals from metallurgy (D.Kerin, Yugoslavia), lichens as indicators of air pollution (F.Leblanc, Canada) and others.

The *WG on Forest Fire Control* discussed six papers, presented by the representatives from Australia, Canada and USA, and one paper (S.O. Andersson, Sweden) was discussed at the joint session with Research Section 25. This WG had developed a preliminary classification system for “forest fire literature and the development of an English-Spanish version of fire control terminology was underway. The commission recommended that a campaign should be launched to extend the use of standardized forest fire prevention signs throughout North America” (Unasylva 1968).

Section 25 *Study of Growth and Yield and Forest Management* (Leader: Dr. Hummel, Great Britain) held meetings in all the seven WGs and discussed 56 papers.

The *WG on Definition of Forest Lands and Methods of Land and Site Classification* discussed an eponymous paper, prepared by the international team, consisting of C.Carbonnier (Sweden), C.M.Bernstain and B.Husch (USA), and A.Nyyssonen (Finland). At the WG on Variation in Forest Stands as a Basis for Planning Experiments, W.L.Pritchett (USA) delivered a paper on testing for response to fertilizers in forests.

The *WG on Estimation of Increment* received five papers including two from the USA – on determination of individual tree volume growth (D.L.Reukema) and on individual tree increment on the US Forest Survey (B.Sprada and R.B.Pope), and one from Austria on estimation of increment (J.Pollanschütz), from Switzerland on optimal estimation of the volume of standing trees (P.Schmidt *et al.*), and from Japan on forest transition as a stochastic process (T.Suzuki).

The *WG on Mensuration Problems in Forest Inventories in Tropical Areas* received six papers, including those on influence of the observer in qualitative grading of standing trees – C.T.F.T. Method (J.P.Lanly, Canada); problems to consider at the beginning of tropical forest inventories (A.J.Nach, USA); critics of the timber survey methods in tropical rainforest (D.A.Boon); problems created by red-deer peeling damage (A.Roeder, Germany), etc.

The *WG on Application of Modern Planning Techniques* (Operations Research, etc.) considered the following five papers: The Use of Operations Research Techniques by Industrial Forest Enterprises in the Southern USA (J.B. Dargavet, Australia and J.E. Bethune, USA); The Use of Operations Research Techniques for Multiple Goal Planning in Forestl Land Management (R.J. McConnen, USA); Programming the Management of Commercial Forest Land (D.I. Navon, USA); Use of Simulation in the Management of Private Forest Estates in Scotland (M.S.Philip, Scotland); Planning an Annual Thinning Program with Linear and 0-1 Integer Programming (R.M. Randall, USA).

The *WG on Mensuration of the Forest Biomass and its Productivity* had 18 paper, covering the following areas of research: measurement methods, accuracy and precision of estimates H.T. Schreuder and W.T. Swank, A. Riedacker, H.A.I. Madgwick, H.E. Young); growth and respective tables (P.L. Marks, T.R. Crow, W.D.Johnston, J.T.Steinbeck); measurements of leaf area, biomass and dry weight (S.T. Nedialkov and A. Asli, D.F. Olson, Jr., J. Zavitkovski); whereas the WG on Forest Working Plans and Yield Regulation in European Countries had one paper from West Germany (H. Kramer). Additional 20 volunteer papers for Section 26 highlighted the use of aerial photography and space imagery.

Section 26 *Forest Recreation and Wildlife* (Leader: Dr. R. Keith Arnold, USA). Discussions centred on the identification of research projects under the new organization of IUFRO. Program goals for the next several years were established. In addition 11 volunteer papers were presented to report about research in such areas as landscape management (A.H. Hoffman, R.Zundel and D. Kettler); recreation (J.L. Knetsch); campgrounds (D. Lockwood, P. Rogen and A. Hoole); code of conduct (P. Rogers).

Section 31 *Forest Economics* (Leader: Dr. N.K. Hermansen). The Section presented reports of its Working groups, reviewed at its meeting. The WG on National Income Accounting for Forestry met in Geneva in 1968 to draft its report, based on the international system (SNA),[200] which was presented at its second meeting in Oxford in December 1970. As a result of this meeting, a draft paper, titled Forestry in National Accounts, was worked out. In this paper the problems of national income calculations in forestry were examined, and a model of production and income

[200] The System of National Accounts (SNA) has been developed and maintained by the UN Statistics Division since 1947.

accounts was put forward. The paper was presented and discussed at the Congress and disseminated to all members for critical review; and after a revision, the report was published in *Folia Forestalia*, Helsinki (Kunnas 1971). Also, it was decided that work in the Group should include studies of the Eastern European National Accounting System, and that consideration should be given to treatment of social benefits and costs of forest enterprises in national income accounting.

The *WG on the Impact of Forest Taxation on Forest Practices and Economy* reviewed the report, titled Principles of Forest Taxation (Grundsätze der Waldbesteuerung), presented for general discussion, and the following three papers: The coordination of rural land use controls and tax policy: Implications for the valuation of forest land and timber under the property tax (E.T. Williams); The impact of different income tax systems in forestry (John Eid); and Die Umsatzbestsuerung unter forstlichem Aspekt [about the forest sale taxation, including the value added tax and possibilities of structuring this tax to meet the peculiar needs of forestry] (W. Kroth and B. Bittig).

The *WG on Forest Economic and Social Considerations and Economic Development* held two meeting during the Congress. It identified two priority needs for research: (1) evaluation of the contribution of forestry to the process of economic development; and (2) effectiveness of policy measures to encourage investments in forestry in developing countries. These recommendations were transmitted to the Section and incorporated into the structure of Division 4 of the revised organization of IUFRO. In addition, nine papers were discussed.

The *WG on Forecasting in Forestry and Timber Economy* reviewed the Forecasting in Forestry and Timber Economy Report: At the Congress in Munich, the WG had presented a preliminary report, called *Forecasting in Forestry and Timber Economy;* this report had been revised and supplemented and published in *Folia Forestalia* (Gregory et al. 1971). The final report thus presented at the Congress in Gainesville comprised a general introduction to forecasting problems and special papers on forecasting demand, forecasting supply, forecasting consumption and price, and substitution as a problem in forecasting. The Group discussed the findings in the report and particularly future activities. Two subjects for this purpose were suggested: (1) forecasting of round wood supply and (2) economic, technological and environmental aspects of wood substitutions.

In addition, the Section reports about three separate meetings of sub-groups or thematic groups (TG). At the meeting of the *TG on Planning Theory*, the Chairman presented a comprehensive report on planning theory, giving an overall description of planning problems and procedures applied to forestry. The *TG on Operational Research* presented the group's report about the meeting in September 1970: Operational Research and the Managerial Economics of Forestry later printed (Forestry Commission 1971). It comprised 15 papers by authors from Bulgaria, Great Britain, Hungary, Germany, Canada, Norway, USA, Czechoslovakia, Sweden, and Switzerland. The TG on Investment Problems in Forestry heard five papers about uncertainty in forestry investment decision regarding timber growing. The group concluded that further work on decision-making under uncertainty should be carried out within a WP or project group within Division 4 of IUFRO.

Section 32 *Forest Operations and Techniques* (Leader: Dr. B. Ager, Sweden). Mechanization and silvicultural techniques, with consideration of biological requirements, was the principal discussion for the Section. Thematic areas for future research were identified on the basis of 8 invited papers, covering various aspects of silvicultural operations, including seed collection, nurseries, soil preparation, planting, tending (cleaning), pruning, fertilization.

At the meeting of the *WG on Harvesting and Transport*, plans were considered for future symposia on Long Distance Transport of Wood Products and Harvesting of Hardwoods.

The *WG on Work Study, Payment, and Labour Productivity* discussed three reports, including a paper on the use of network analysis, mathematical programming, and simulation (T.J. Corcoran).

Discussions in the *WG on Operations Research and Logging Systems* were focused on Long-Range Planning of Forest Operations (S. Andenson). In addition, 12 other papers were presented for at the meetings of the same Section.

Section 41 *Forest Products* (Leader: Dr. H.O. Fleischner, USA). Following a discussion of standardization of wood measurement, the members agreed that a working group should be formed to stimulate and coordinate research on the problem. The Working Group on "Wood Protection" heard and discussed seven papers, mostly from European countries (4 from Germany, 2 from Holland and 1 from the USA). In addition, the WG considered a draft report, called *Standard Method for Field Tests with Wooden Stakes;* and also discussed the paper, called *Unification of Panel Tests for Evaluating the Natural Durability in the Heartwood of Wood Species and Efficacy of Wood Preservatives in Seawater*.

The W*G on Tropical Woods* reviewed 3 papers during its two sessions. It discussed the publication, titled *Properties and Utilization of Tropical Woods* (A.D. Freas and W.Liese), and reviewed related papers from other countries, in particular, from Australia and Japan.

Eighteen papers were presented at two sessions of the *WG on Microscopic Characteristics of Wood Quality*; they covered methodological aspects (X-rays of increment cores, seasonal variations of humidity in standing trees, spiral grain, microscopical features of wood defects, etc..), as well as wood properties (wood density, etc.) of some pines (*Pinus densiflora*, *P. radiata*) and eucalypts (*Eucalyptus alba, E.saligna*). Additionally, 7 papers were presented.

One or two papers were presented in WGs on Performance of Wood in Fire, WGs on Tree and Wood Chemistry, WGs on *Wood Physics and* WGs on *Wood Protection*.

The *WG on Structural Utilization* reviewed 19 papers, thematically ranging from design procedures for glulam to computer programs, relating to structural analysis of wood.

At the plenary session of the Section, Dr. J.P. van Buijtenen reported about the work of the TAPPI Forest Biology Committee[201], and Dr. Steenberg, Assistant Director General of FAO, spoke about collaboration between the FAO and IUFRO in the field of forest products research and development. In conclusion, Dr. P. Koch described technological developments in the southern pine industry in the USA.

The workload increased not only for Section 41, but for all other Sections and it called for restructuring in the Union, e.g., Division 5 “included subject groups on wood quality, wood engineering, wood protection, and wood processing, each with several specialized working parties, and a project group on properties and utilization of tropical woods. All of these reflected the increasing scientific and technical needs for wise use of the forest resource in both domestic and international industry and the increasing trade in forest products from the tropics as well as the industrialized world” (Youngs and Youngquist 1999, p.627).

At the Congress Closing Ceremony, the post-Congress excursions were described.

The new IUFROM Scientific Achievement Award (SAA) was won by scientists: Edwin Donaubauer from Austria, F.D. Podger from Australia, Donald M. Fuqua and Gene Namkoong from the USA, and Dusan Zachar from Czechoslovakia who could not attend the Congress.

IUFRO President George Jemison reported about the Congress attendance (681 delegates); about the new structure of the Union, emphasizing the establishment of units to address social aspects of forestry which had been hardly hoped for four years ago. He also talked about the work and decisions of the International Council at its two meeting, attended by 40 out of its 45 members; about the new IUFRO Statutes; about the need to have a permanent Secretariat for IUFRO and its

[201] The Technical Association of the Pulp and Paper Industry (TAPPI), international non-for-profit organization, founded in 1914.

financial support; about the election of Professor Alessandro de Philippis from Italy IUFRO Honorary Member.

Then, President Jemison announced that the next Congress would be held in Norway; presented the recommendation on the election of a new President, Vice-President, and members of the Executive Board, and gave the floor to the newly elected President – Professor Ivar Samset (1972-1976) from Norway.

Professor Samset gave a few comments on the role of President Jemison during the challenging period with its IUFRO reorganization, adoption of the new Statutes, need to address the establishment of a permanent Secretariat, etc., and said that the International Council had elected Prof/ George M. Jemison to the rank of "Honorary Member" for his highly valuable contribution. He also emphasized the role of the new structure and expressed hope for fruitful work of the Union in future. In addition, he said about the wish to keep cooperation with the FAO, especially, in view of the next World Forestry Congress to take place in the Argentina in 1972, i.e., in the year of the 80th anniversary of the Union, having good reasons to actively participate in the Congress.

In conclusion, he noted that the new Statutes and Internal Regulations provided excellent opportunities for progressive activities, and said: "Our first Statutes were agreed upon during the IUFRO meeting in Eberswalde in Germany in August 1892. There were only six paragraphs. It is interesting to note that their aim was practically the same as in the existing Statutes (article II, paragraph 1) which reads: 'The main aim of the Union is to promote international cooperation in scientific studies, embracing the whole field of research related to forestry including forestry operations and forest products'". The same mission was worded at the 15th Congress: "Our goal must be to strengthen IUFRO by facilitating good international cooperation, especially among young, perceptive scientists" (IUFRO 1971, p.276).

The President Jemison introduced the newly Vice-President, Dr. D.R. Redmond from Canada and new Members of the Permanent Committee; and gave the floor to B.K. Steenberg, Assistant Director General of the FAO, who had been Research Director of the Swedish Forest Products Laboratory for nearly 25 years (1944-1968).

Dr. Steenberg touched upon different facets of IUFRO activities, emphasizing its fruitful cooperation with the FAO to address a broad range of issues. In particular, he reminded about many technical meetings, seminars, and other activities in which IUFRO and FAO had been and were jointly engaged, including such gatherings as the World Consultations on Forest Genetics and Tree Improvement (Stockholm 1963 and Washington, D.C. 1969), the Symposium on Internationally Dangerous Forest Diseases and Insects (Oxford 1964), and the Seminar on Statistical Methods and Data Processing in Forestry (Sweden 1969); and about such forthcoming events as the World Consultation on the Use of Wood in Housing (July 1972, Canada), the meeting on Forest Education and Training (September 1972, Stockholm); and technical meetings on Fertilizers in Forestry, and on Forest Productivity, which were under discussion at the time.

Then the floor was given to representatives from the Resolutions Committee, Regional Representatives and Professor E.T. York, Jr., Provost, Institute of Food and Agricultural Sciences at the University of Florida. After that, the Congress was adjourned.

Organizational matters

The Congress institutionalized the outcome of long discussions about how to improve the activities of the Union. It was its third major reorganization.

The Statutes and Internal Regulations: These underlying documents were periodically revised as conditions required as had been done in 1932, 1948 and 1961. After the 1967 Congress with its unexpected attendance by almost 1,000 persons, it was suggested that IUFRO activities

should be reorganized with regard to the increased number of scientists and research workers who were keen to cooperate. The International Council instructed the newly-elected President to recommend revised Statutes and Internal Regulations that would more nearly serve the needs in a world where forestry problems were rapidly changing. To draft revised IUFRO Statutes, an Organization Committee was established and led by Professor Ivar Samset. The Committee consisted of Professors Hummel, Liese, de Philippis, Richard, and Redmond. Voting by mail, the Council approved the revised Statutes by majority of votes late in 1970, and it was made effective since March 15, 1971. The new Statutes brought about the following changes:

(1) The aims of IUFRO were clarified and broadened.

(2) The Permanent Committee was replaced by an Executive Board, including also regional representatives and technical program coordinators. This change gave research program leaders direct participation in the major affairs of IUFRO.

(3) Research Sections were replaced by Subject Groups and Project Groups to provide a home for everyone in the organization who had an area of special interest.

(4) Changes were made in the operational procedures for conducting business and dealing with major, high-level matters in the International Council.

(5) The responsibilities of the various organs of IUFRO were clarified.

The Board consisted of 19 members, including the President, Vice-President, six Division Coordinators, as nine members, elected with due regard to geographical considerations, and two more members. The Internal Regulations were accordingly revised to be consistent with the new Statutes and disseminated in 1972 (IUFRO 1972).

Structure: The rapid growth of the scale and scope of IUFRO activities called for complete reorganisation which was formalized at this Congress. The Statutes aligned the work of Sections through changing their contents and differentiating them. The Sections were replaced by subject groups, put in place for long periods, and temporary project groups to address specific issues within limited periods of time. All the groups were assigned to the six Divisions. The Soviet participants of the Congress gave the following brief clarifying definitions of the new structural units of IUFRO:

"Division 1: Forest Environment and Silviculture is designated to study forest ecosystems (biogeocenoses), landscapes and their classifications (including soil/moisture interactions); forest management for soil and water conservation (including forest benefits, forest hydrology, and monitoring); development of tree stands and their treatments (including application of fertilizers); tropical; forestry, growth and yield studies (including forest mensuration); wildlife management (including its links with silviculture); forest fire prevention, control and use of fire for reforestation purposes and forest fire fighting.

Division 2: Forest Plants and Forest Protection is designated to study forest botany (physiology, systematics and dendrology), genetics and breeding, plant diseases, entomology and forest pest management.

Division 3: Forest Operations and Techniques covers mechanization of forest operations, including construction, machine-building and technology for all forest activities, ergonomics, planning and monitoring of forest use, assessments of labour conditions, remuneration and productivity.

Division 4: Planning, Economics, Growth and Yield, Management and Policy embraces forest inventory (resource data collection and analysis), forest information and management planning as a basis for planning and forest policy development, forest business economics (including planning methodologies, administration, economic analysis and monitoring); national and international economy and forest policies (including the role of the organization in its development);

Division 5: Forest Products explores key properties (including microscopic and macroscopic

characteristics) of wood and other products, wood utilization in construction, wood conservation in storage and use, physical composition, drying, processing and condition in use;

Division 6: General Subjects (Recreation, Landscape, Statistics, Terminology, Information, Education, History) undertakes studies in support of research to address a broad range of technical issues, including statistical methods, mathematics, computing equipment information systems (including bibliography), terminology, education, research organisations, forest history; forest management for recreation and landscape management, including links with other efforts to manage forest resources" (Мелехов, Моисеев, Коломиец 1972, p.169).

In 1971, the IUFRO Congress established 38 subject groups, 17 project groups and 99 working parties, under the 6 divisions, but their numbers were soon changed into 40 subject groups and 14 project groups, covering 145 working parties (Speer 1972).

In accordance with the newly approved documents, another important decision was made about the IUFRO Secretariat.

Permanent Secretariat: Prior to 1956, the FAO's Forestry and Forest Industries Division provided routine administrative support for IUFRO through its own staff. After 1956, IUFRO's Secretariat had been the domicile of its President, The President had been directly responsible for all of the operational, administrative, and financial chores usually with no one to help him or at best, only aided by voluntary assistance his organization might provide. As the President changes every four or five years, so too, does IUFRO headquarters change. In such a situation, IUFRO could not provide good service to its members, e.g., it had been very detrimental for the records of the organization, preparation of necessary reporting, information, financial and other documents; and, in addition, it had been necessary to recruit and training new personnel. Therefore, it was decided to establish a permanent secretariat in one of the countries though it would entail recurrent costs for the Union or its member organisations.

This Congress decided to return to a permanent secretariat for IUFRO. It was proposed to base it in the Forest Research Institute in Birmensdorf, Switzerland, but the Swiss legislation did not permit it. A way out was found later when the Austrian Federal Research Institute of Forestry (Schönbrunn, Vienna) offered to home the IUFRO headquarters, and became the official home of the Union. That complicated restructuring was necessitated with the growing interest to the Union in the world, accounted for by the broadening range of issues to be addressed through forest research in many countries as well as the desire to make integrated, joined efforts more transparent and facilitate the search for partners to undertake joint studies.

The Norwegian Royal Ministry of Agriculture sent a formal invitation to hold the 16th Congress in Norway during the period 1975 to 1977. The decision to hold the Congress in Norway was unanimously adopted.

The new IUFRO Board consisted of the Leaders (Coordinators) of the newly established Divisions: Professor D. Mlinsek (Yugoslavia) for Division 1; Dr. R.Z. Callaham (USA) for Division 2; Dr. B. Ager (Sweden) for Division 3; Dr. G. Speidel (West Germany) for Division 4; Dr. H.O. Fleischer (USA) for Division 5; and Professor J. Parde (France) for Division 6.

The elected Regional Representatives were Professors V. Holopainen (Finland) for Northern Europe; W. Liese (West Germany) for Western Europe; I.S. Melekhov (USSR) from Central Eastern Europe; E. Giordano (Italy) for the Mediterranean Region; T. Satoo (Japan) for Asia; Dr. D. Iyamabo (Nigeria) for Africa; Dr. R. Keith Arnold (USA) for Canada and the USA; Dr. W. Barrett (Argentina) for Latin America and Caribbean; and Dr. D.A.N. Cromer (Australia) for Australia.

The decision was made on IUFRO Scientific Achievement Awards. President Jemison: "IUFRO is indebted to Dr. D.A.N. Cromer (Australia), member of the Permanent Committee, for his outstanding work in developing the designs for the medal and scroll and for getting these items produced. Professor Leonard Leyton (Great Britain) has headed an Awards Nomination Committee,

made up of R. Villasenor (Mexico), I.S. Melekhof (USSR), R. Karschon (Israel), F. Mergen (USA), and D.A.N. Cromer (Australia). The Committee screened 26 nominations submitted from seven countries. The Permanent Committee has selected five outstanding men to receive this, the first IUFRO Scientific Achievement Award" (IUFRO 1971, p.271).

Resolutions

The Congress almost unanimously adopted the following five resolutions, four of which contained an expression of gratitude to organizations and individuals. However, these resolutions were useful for organizers of future Congresses as they showed the range of issues to be addressed, including mobilization of political and financial support.

Resolution I

WHEREAS The concept of Global Research Projects, recently adopted by the United Nations Development Program appears particularly well suited to forest gene resources

NOW THEREFORE BE IT RESOLVED that the delegates of the Congress express the hope that the United Nations Development Program will establish a global research project for the exploration, collection, evaluation, conservation and utilization of forest gene resources. (Following the reading of this resolution, the President asked for comments. There being none, a vote was taken and the resolution was adopted.)

Resolution II

WHEREAS The XV IUFRO Congress, now drawing to a close, has been held on the campus of the University of Florida, Gainesville, Florida and

WHEREAS The environment and facilities of the University have contributed substantially to the success of the Congress and

WHEREAS The University President, the Division of Continuing Education, the Institute of Food and Agricultural Sciences, the School of Forestry, the Director of the J. Wayne Reitz Union, and other units of the University have been generous and effective in their support of the Congress

NOW THEREFORE BE IT RESOLVED that the International Union of Forestry Research Organizations assembled on March 20, 1971, expresses its sincere appreciation for the hard work, many courtesies, and friendly assistance rendered to individuals and to the entire body of the Congress, and directs the President to convey to the University President and his staff our thanks and best wishes.

Resolution III

WHEREAS The organization of a large and complex International Congress requires the support of many people of many talents, and

WHEREAS The costs of this Congress are substantial and, in fact, exceed the meagre resources of an organization such as IUFRO, and

WHEREAS The talented people and the leaders of the Forest Service, U.S. Department of Agriculture have given unselfishly of their time, equipment, and other resources

NOW THEREFORE BE IT RESOLVED that this Congress recognizes such support with gratitude and directs the President of IUFRO to communicate to the Chief of the Forest Service end to the Secretary of the U.S. Department of Agriculture IUFRO's appreciation for the assistance that contributed so significantly to the success of the XV Congress.

Resolution IV

WHEREAS The National Science Foundation and the U.S. Atomic Energy Commission, two organizations of the United States Government that support or conduct basic and applied research in many areas of interest to forestry, and

WHEREAS These two organizations have provided substantial financial assistance for the XV IUFRO Congress and thereby have contributed materially to its success

NOW THEREFORE BE IT RESOLVED that the delegates to the Congress

collectively express their appreciation and extend their sincere thanks to the Director of the National Science Foundation and the Administrator of the U.S. Atomic Energy Commission in Washington. D.C., for their generous support.

Resolution V

WHEREAS The planning, organization, and conduct of a IUFRO Congress requires the coordinated efforts of many people over a period of several years and

WHEREAS The XV IUFRO Congress has benefited especially from sound planning and dedicated efforts of a Committee who organized and carried out many difficult tasks to make it a success

NOW THEREFORE BE IT RESOLVED that the delegates to the XV IUFRO Congress, assembled at this closing ceremony on March 20, 1971, do express their gratitude to the Congress Organizing Committee - to its Secretary General Herbert C. Storey, and principal Committee Chairmen Dr. John Gray, Dr. R. Keith Arnold, Dr. Karl F. Wenger, Dr. Robert Youngs. Mr. Allen Mullen, Mr. William Scruggs, Mr. Irvin Reigner, Col. H.B. Donaldson, and the many others who worked hard and long to make this Congress a success.

(Resolutions II to V were passed unanimously.) (IUFRO 1971, p.280-281).

Words of gratitude were also said by seven delegates, representing major areas of the world: Mr. J.D. Boyd, Australia (for Australasia), Dr. S.K. Hyun, Republic of Korea (for Asian Countries), Dr. Wilfredo Barrett, Argentina (for Latin America and Caribbean), Mr. D.E.Iyamabo, Nigeria (for Africa), Dr. Bela Keresztesi, Hungary (for Europe), Dr. Natelina Azevedo, Portugal (for Mediterranean Countries), and Dr. L. Sayn-Wittgenstein, Canada (for North America)". The closing address was delivered by the President of the University of Florida, Professor E.T. York, Jr.

Then "meetings of the Divisions were held to discuss details of their structures, division into subject groups and working parties, and to appoint managers in these units", including those from the USSR (Мелехов, Моисеев, Коломиец 1972, p. 170).

Excursions

"After the Congress, its participants were offered tours to see forests, forestry and forest research management in some of the States of the USA" (Мелехов, Моисеев, Коломиец 1972, p.170). A total of 190 delegates and wives participated in four post-Congress technical tours. Each of the tours began on Sunday, March 21, 1971, and ended on Saturday, March 27, 1971. They were designed to complement Congress papers and discussions, showing on the ground some of the outstanding features of forestry in the southern and south-eastern parts of the States. They were also designed to provide opportunities for exchange of ideas on problems and progress in forestry research and practice. R. Keith Arnold, Deputy Chief for Research, USDA Forest Service, noted in his address at closing session: "IUFRO tours are not just for us to show you our forestry; on the contrary, the tours are for you to show us our own forestry" (IUFRO 1971, p.270).

Before the Congress, 15 routes had been offered, but ultimately, four tours were selected with one of them being a combination of two previously identified routes (5 and 9).

Tour 5 (9): Forest tree improvement and forest fertilization in the Coastal Plain of the southern United States (Leader: Dr. Daniel Schmitt, U.S. Forest Service, and Dr. William Pritchett, University of Florida). Originally, two tours were planned. When the groups were merged, the tour offered an opportunity to learn about the experience in improving the quality of forests, using genetic and breeding methods as well as applying fertilizers in the Coastal Plain of the southern United States, from north Florida to southern Missisipi. Particular emphasis was on improvement and fertilization of the major southern pine species *Pinus elliottii*, *P. palustris*, *P. taeda*, *P. echinata* and other important tree speicies such as *Liquidambar styraciflua*, *Platanus occidentalis* and *Quercus* spp.

Tour 6: Research and applications in silviculture of the forests of the southern Coastal Plain, Piedmont, and southern Appalachians (Leader: Paul Guilkey, Robert McAlpine, and Dr. LeRoy

Jones, U.S. Forest Service). It included visits to experimental and commercial forests in north Florida, Georgia, and western North Carolina, forestry research laboratories in Georgia, and the Cradle of Forestry in America near Asheville, North Caro1ina. The Soviet delegation joined this tour and its member wrote afterwards: "Our delegation had an opportunity to visit forests in three south-eastern States of the USA: Florida, Georgia and North Carolina" (Мелехов, Моисеев, Коломиец 1972, p. 170).

Tour 7: Mechanized industrial forestry practices in the southeastern United States (Leader: T.A. Harrington, Paul Schillings, and Thomas Chappell, U.S. Forest Service). Several aspects of mechanization research and practice were demonstrated in a series of visits across northern Florida, Georgia, and eastern Alabama. It included nursery operations; harvesting; regeneration; integrated wood processing; forest technician training; equipment development, manufacture, and testing; and forest engineering research.

Tour 15: Forestry, forest industry, and forestry research in south-eastern United States (Leader: James Wells, Dr. Robert Schultz, and Robert Cooper, U.S. Forest Service). Paralleling many parts of Tour 6, this tour branched out to demonstrate forest practice, forest industry and related research in north Florida, Georgia, and western North Carolina. As did Tour 6, this tour ended with a visit to the Cradle of Forestry in America near Asheville, North Carolina.

Soviet/Russian participation

According to the Congress proceedings, three scientists from the USSR participated in the Congress: Professor I.S. Melekhov from the USSR Academy of Agricultural Sciences, Dr. N.A. Moiseev from the USSR State Forestry Committee and G.M. Kolomiets from the Institute of Biology, Siberian Branch of the USSR Academy of Sciences (IUFRO 1971).

Professor Ivan S. Melekhov was elected Member of the Board as a representative of Central and Eastern Europe as well as one of the six members of the IUFRO Nomination Committee to evaluate nominees for the IUFRO Scientific Achievement Award.

Representatives of the Soviet Union submitted a number of papers to the Congress which were listed in the Proceedings under different Research Sections and Working Groups:

- Kozubov G.M. Aspects of coniferous reproductively in the North (*Pinus silvestris*);
- Nekrasova T.P. Morphogeny of generative organs of Siberian fir;
- Grimalsky V.J. The resistance of Scots pine against needle eating insects;
- Rudnew D.F. [202] The essence of the resistance of trees to insect pest attack;
- Rudnew D.F. and Zemkova R.I. Some factors of the resistance of tree seeds to insect pest attack;
- Smeljanets V.P. Defensive systems of Scots pine against pest insect attack;
- Stadnitsky C.V. Dynamics of cone-inhabiting insect populations; and
- Vassechko C.I. Spruce resistance to bark beetle attack.

Interesting facts

Upon adoption of the new Statutes and new structure of the Union, its new logo was introduced – it was the so-called *rocket* though for the first time, this logo was used in the Annual Report for 1968, published in 1969. Actually, this symbol remained the official logo of IUFRO until 2002. The decision to introduce the new logo was adopted in 1968 at the IUFRO Permanent and Enlarged Committees' meeting in Olomučany, in the Czech Republic (Buck 2014). The new logo was conceived to reflect the spirit of unlimited growth, typical of the late 1960s and 1970s. The

[202] D.F. Rudnev (Rudnew) (1902-1987) was a prominent entomologist; graduated from the Leningrad Forest Technical Academy; his well-known students were R.I. Zemkova, V.P. Smelyanets, G.I. Vasechko and others. http://www.icfcst.kiev.ua/VASECHKO/VsRudnev_r.html

spruce, depicted in the emblem, is a symbol of good forest growth and high yield and accentuates movement forwards and upwards while the globe symbolizes universal access and global coverage (Schmutzenhofer 2002, p.3).

[Participants of the IUFRO MC meeting, Olomučany, Czech Republic, 1986, at the memorial stone with the first IUFRO logo. From left to right: R.Morandini, S.Parde, E.Teissier du Cros, J.Burley, R.Seppala, K.Vancura, H.Schmutzenhofer, D.K.Lee. Courtesy of K.Vancura.]

There is more evidence about the development of this emblem compared with the first one, but it comes from reminiscences of IUFRO Honorary Members with no official records preserved. During the Presidency of George M. Jemison (USA), a special committee was set up to draft new Statutes and structure of IUFRO which were made effective after the 15th IUFRO Congress in Gainesville, Florida, USA, in 1971. This emblem was the symbol of IUFRO until 2002, it may be found in most IUFRO publications for over three decades. The logo was quite recognisable because IUFRO held more than 70 meetings per year in all parts of the world.

According to Professor Ivar Samset, IUFRO President (1971-1976), Member of the above Committee, IUFRO Honorary Member, and Professor Ricardo Morandini, the idea of such a logo was generated by Member of the Permanent Committee for Australia N. Cromer from the Forestry Research Institute in Canberra (Schmutzenhofer 2002, p. 3).

To enhance the role and prestige of forest research as well as to call attention to the contribution of young scientists in international forestry research, the Permanent Committee developed the IUFRO Scientific Achievement Award Program. In accordance with the Statutes, the awards were meant for outstanding scientists, 45 years of age or younger, who had distinguished themselves in any specific aspect of forestry or forest products research. Individuals selected for this honour would receive a gold medal, scroll, and cash honorarium.

The medal and scroll had been designed by Dr. D.A.N. Cromer (Australia), Member of the Permanent Committee. The Awards Nomination Committee screened 26 nominations, submitted from seven countries; and the Permanent Committee selected five outstanding scientists to receive this, the first IUFRO Scientific Achievement Award; those awardees were Dr. Edwin Donaubauer from Austria, Donald McFuquay and Gene Namkoong from the USA, Francis D. Podger from Australia and Dusan Zachar from Czechoslovakia.

During the Congress, the IUFRO leadership had a meeting with leaders of International Union of Societies of Foresters. To mark their participation in the Congress, representatives from 23 countries planted trees in the campus of the University of Florida (Holscher 1991).

It would appropriate to note here that in the challenging time of IUFRO's revival after the First and Second World Wars, Sven Petrini (Sweden) was the Secretary of the Union (1929-1948). Upon signing the Agreement between IUFRO and FAO in 1949, the IUFRO Secretariat was based in the FAO Headquarters; and during the period of 1949–1956, the secretarial functions were performed by the following staff of the FAO: R.G. Fontain, I.G. Heig and L.J. Vernell. After 1956, there was a 17-year period when the secretary role was undertaken by the voluntary Assistants to Presidents D. MacDonald, J. Speer, G. Jemison and I. Samset.

After moving to its permanent headquarters in 1973, IUFRO had the following Austrian Secretaries: Otmar Bein (1973-1987)[203], Heinrich Schmutsenhoffer (1987-2003), Peter Mayer (2003-2010) and Alexander Buck (2010 – till the present time).

[203] Otmar Bein is a well-known scientist, the author of the Reference Book: *Literature of the Austrian Federal Forest Research Station for 100 years* (Bein 1974).

Chapter 21
Congress XVI – June 20-July 2, 1976, Oslo, Norway

This section draws from the 16th IUFRO World Congress Report, published in 1977 in Ås by the Norwegian Forest Research Institute (IUFRO 1976a), and from reminiscences of participants of the Congress (Lier 1976; Уткин, Кайрюкштис, Протопопов 1977).

The Congress sessions were held on June 20-26, 1976, and on June 27, 1976, the participants went to scientific excursions.

Overview

The 16th Congress was held under the title: *Forestry in a World of Limited Resources* and it was the first Congress, attended by over 1,000 delegates from 320 member organisations from 67 countries. The 1,301 participants included 1,065 delegates and 236 accompanying persons, as well as 33 associated and 2 corresponding members.

As of the date of the Congress, the number of the countries represented in IUFRO, increased to 75 as it was joined by Ghana, Ivory Coast (now: Cote d'Ivoire), Madagascar, Papua-New Guinea and Upper Volta (now, Burkina-Faso), and the total number scientists reached nearly 10,000. Most delegates were from Northern (31%) and Central (20%) Europe, North America (19%) and Mediterranean Region (10%) whereas the shares of other regions was smaller: 7% from Asia, 6% from Africa, 4% from Eastern Europe and 3% from Central and South America and the Pacific (IUFRO 1976a).

The Congress included 8 plenary sessions, 11 divisional meetings and 206 meetings of the 37 Congress Groups. The Congress received 712 papers, including 293 invited papers and 419 discussion papers. Fifteen study tours were offered for the delegates.

In addition, the FAO/IUFRO Discussion Meeting on *Ways and means of reconciling silvicultural and operational methods in modern forestry* was associated with the Congress and held on June 25, 1976; it was attended by more than 150 people (IUFRO 1976a) and discussed 4 invited papers (IUFRO/FAO 1976).

Scientific program

The Congress started its work at 10:00 a.m. on June 21, 1976 in the central conference-hall in the University of Oslo.

At the Opening Ceremony, Norwegian Prime-Minister Odvar Nordli emphasized the important role of forests in human life as a source of raw material for construction, energy generation and processing; a source of employment to people, often in combination with agriculture; a home for wildlife; and also as a climatic and soil conservation factor; and an aesthetic factor, benefitting landscapes. Underlining the importance of forest research, he noted that long-term work of foresters would have "a time perspective, going far beyond the life-time of the individual research workers". The Premier declared the Congress opened.

Professor Hans Kristian Seip, Director General of Forestry in Norway, talked about the role of forests in the economy and development of Norway. He singled out two "big steps" in the nation's development: in the year 1520 when Norway had established sawmills, and in the year 1880 when the pulping industry had created a demand not only for big sawlogs, but also for smaller dimensions.

Speaking about those developments, he said: “This made forestry as a professional and scientific field most important to our country. While the few professional foresters, educated abroad (who tried to introduce non-traditional methods in Norwegian forestry in earlier years) had a very hard time, now, Norwegian forestry education was well-established. Two things were soon realized. First: There was a danger for exhausting the forest resources, and second: It would be possible to develop the forest resources to a considerable higher level provided we were able to learn how to do it. Thus, the national forest survey and organized research were established some 60 years ago. From that time forestry has developed more rapid and more systematically. The survey has given us increasingly accurate and detailed information about the forest and has thus been an important tool in identifying problems and forming strategy. It showed a country where 50% of the area was mountains above timberline and therefore could have no forest production. A considerable part of the rest was also for various reasons unproductive. Only 21% were recognized as productive forest” (IUFRO 1976, pp.20-21).

The opening speech of IUFRO President Ivar Samset highlighted the work and development of the Union. Among other thons, he said: “The Union reorganized its structure when needed: in 1929, 48, 61 and 71. IUFRO has old traditions and young vitality, always able to meet important demands” (ibid., p.22). Describing IUFRO activities for the latest 5 years, the speaker stressed: “Before 1971, the Union was divided into 12 Research Sections with 80 Working Parties. Today, the work is carried out in 58 Research Groups and 160 Working parties. Since 1971, the number of office holders has increased from 108 to 366” (IUFRO 1976, p. 24).

The speaker listed key challenges for silviculture, including the need and efforts to expand areas, set aside for afforestation to make up for the centuries of shifting agriculture[204] and careless land use, big shares of cut volumes, “left to rot on the forest floor”, widely spread manual labour, etc. Professor I. Samset also underlined: “The main goal of forestry sciences is to give service to practical forestry. All ways and means should be used to ensure that research findings are of practical value and being put into use in practical forestry and forest operations” (ibid., p. 24). He noted that many forestry issues could be more effectively addressed with public forest management; and that the growth population of the planet would result into a terrific demand for wood products. He said: “Bearing in mind the serious problems of global resource limitations, the forests have some advantages: they are renewable, misused land can be replaced by productive forests, the forests can deliver benefits to mankind by means of good operational methods” (ibid., p. 24).

During the opening ceremony, the IUFRO SAA was received by the five young scientists from the following countries: the USSR (Professor A.S. Isaev), Finland (P. Hakkila), Belgium (Dr. A.V.J.G. Nanson), Great Britain (Dr. J.A. Petty) and the USA (Dr. D.E. Reichle). They entered the rostra under the leadership of the Chairman of the Award Committee Professor Leonard Leyton from Oxford. When the winners entered the rostra, three horns were playing *The Song of the Forests*, written and composed by Professor Erling Eide, leader of Norwegian forestry research from 1921 to 1956, and arranged for three horns on the occasion of the 16th IUFRO World Congress.

Professor I. Samset greeted the winners and stressed that 42 scientists had been nominated for the Award. The Executive Board appointed the following scientists members of the Award Committee: Professor Leonard Leyton, Oxford University (Chairman), Academician Ivan Stepanovich Melekhov, USSR Academy of Sciences in Moscow, Professor Kalle Putkisto, University of Helsinki, and Professor Ion Milescu, Forest Research Institute, Romania.

“Dr. Alexander Sergeyevich Isaev, Krasnoyarsk, Siberia, USSR, born 1931, was educated in wood engineering and forestry from Leningrad Forest Technical Academy 1954. He became

[204] It was similar to a combination of primitive shifting agriculture and slash-and-burn farming.

Doctor of Forestry In entomology at the All Union Institute of Forestry Practice in Moscow 1960. Dr. Isaev started as research officer in 1960 and was later promoted to Professor and Vice-Director of the Institute of Forest and Wood Science of the USSR Academy of Sciences, Siberian Branch.

Dr. Isaev is a specialist in ecology and dynamics of forest insect quantity. He has published 62 scientific works, and headed a series of investigations concerning protection of Siberian forests. This includes important investigations of the resistance mechanisms of a tree against pests and he has worked out the scientific bases of the dynamics of the quantity of one of the most dangerous group of wood pests. Dr. Isaev was the author of the general theory of forest association resistance to destructive insects, based on the principle of stability of mobile ecological systems. The principles of quantity regulation and mathematical modeling worked out by Dr. Isaev are used in the forestry practice of Siberia in integrated protection of forests" (IUFRO 1976, p.27-28).

Academician A.S.Isaev remains the only representative of Russia who won this Award.

After this ceremony, the IUFRO President gave the floor to "His Royal Highness, Crown Prince Harald, who attended the Opening Session. Crown Prince Harald handed over the Award to each of the Award winners, assisted by Prof. Leonard Leyton. The Award consisted of a gold medal and scroll together with a cash of 3,000 Norwegian Kroner. Afterwards the President handed over a painting to His Royal Highness in memory of the XVI IUFRO World Congress" (IUFRO 1976, p.29).

Five keynote speeches were presented at the general plenary sessions of the Congress.

Assistant Director-General of FAO UN K.F.S. King, in the beginning of his presentation, titled *Forest Resources of the World*, cited Frederick E. Smith (1970): "Forests are the greatest achievement of ecological evolution. They are the largest, most complex, and most self-perpetuating of all ecosystems. It is in forests that natural regulatory processes excel, producing the most stable of all ecosystems" (IUFRO 1976a, p.158). Dwelling on the last point, he showed that with rapidly increasing population, and the rise in expectations of most people for a good life, as well as the realisation that the supply of most of the world's resources was finite, this quality of renewability was of much more importance than it had ever been.

He reminded that the total land area of the world was 13,003 million ha, of which 4,030 million ha had been classified as forest land. Talking about the influence of forests on the climate, heat exchange, water and atmosphere, he said: "Forests are one of the climatic buffers on which mankind depends - a buffer which, because of its complex organic structure, is able to withstand somewhat severe perturbations of its physical environment, provided that the changes and stresses to which it is subjected are not pushed beyond a certain threshold" (ibid., p. 160). Then, he noted that forests provided numerous and diverse goods and services, and wood for various needs though half of the global wood harvest and up to 90% in developing countries were used as fuel. He said: "We have not yet begun to tap fully the resources of the forests, and to convert commercially and economically the various raw materials which exist in the forest ecosystem. We have not yet begun to adapt fully those advances in science and technology that are relevant to the forestry and forest industries" (ibid., p.164).

In particular, he talked about the use of wood wastes to produce polymers or liquid fuel, use of foliage of trees, and new engineering processes which synthesized various wood components (particles, fibres, fibre bundles, flaker) and non-wood components (plastics, metals, glass and other minerals to produce entirely new types of product. In addition, he pinpointed problems in forest management, in particular, saying that in Asia and the Far East about 50% of the forests were under some form of management whereas in Africa and Latin America, the proportion of forests known to be under management was only 14% though, perhaps, more serious than the absence of management was the mismanagement which took place. Speaking about many tropical countries, he said that

most problems had not been even listed, classified or analysed on a systemic basis; and that to this end, it was necessary to promote forest programs between developed and developing countries.

The next speaker was Dr. Norman E. Borlaug (International Centre for Maize and Wheat Improvement/CIMMYT, Mexico) whose address was about mobilizing world land resources to meet the growing needs for food, fibre, forest products, wildlife and recreation. He drew attention of the audience to food deficit due to lack of land and harvest fluctuations in many developing countries, the food crisis of 1972-1975, marine food resources and the role of forests for fields and cattle.

Professor Martin Bendz (Royal College of Forestry, Stockholm, Sweden) touch upon the thematic focus of the Congress in his keynote address on *Multipurpose Forestry in a World of Limited Resources;* in particular, he said that the concepts of "multipurpose forestry" and "multiple use" boiled down to "simultaneous use"; no matter how forests were managed, the future productivity of forests was always under discussion. He also said: "When we discuss the future production from our forests there are in principle two different horizons: (1) in the long run - to make use of the production potential; and (2) in the short run - to make use of existing forests. In the long run the possibilities of what might be called 'ecosystem engineering' will set the limits for biomass production... Our limit is set by the total energy insolation to the ground… However, the efficiency of the plant is far from maximum. (…) Only by a thorough analysis of the biological/physiological limits of growth, inherent in plants, such increases will be possible to reach. The same is true for most processes in the forest soils" (IUFRO 1976a, p.249-250).

At the same time, the speaker warned against overdoing with exotic species, chemicals and fertilizers which could results into nitrate accumulation, drainage, etc. In conclusion, he urged IUFRO to address the task of increasing the productivity of forests in an integrated way, based on collaborative multipurpose forestry research and labour intensification by means of mechanized operations, improved management and exchange of best practices.

O.L.Forgacs, Research Director, MacMillan Bloedel Limited, Vancouver, B.C., Canada, gave a presentation entitled *Forest Products Industry in Transition* and noted: "We live in a world in which every business decision and every technical change has to be considered in the context of its environmental, social and political consequences". He also commented on the most prominent views of the future that were discussed; particularly those proposed by the reports to the Club of Rome (Meadows et al. 1972; Mesarovic and Pestel 1974)[205] and those proposed by its opposite - the Hudson Institute (Kahn, Brown and Martel 1976)[206]. Then, the speaker described prospects for the market of the pulp and paper industry, development of production apacities, correlation between the Gross Domestic Product and paper consumption as well as touched upon pollution abatement and, hence, costs of pollution abatements which constrained the growth of investment rates. Talking about the role of wood in construction, he offered a cost/revenue analysis of the use of various construction materials (cement, steel, aluminium, panels, etc.), taking into account the energy component. The analysis showed that construction, based on wood and wood-processing products was the least energy-intensive. He concluded: "The answer to the question - Should we use more wood for construction?, has to be an emphatic 'Yes' so that non-renewable and energy intensive materials, such as steel and reinforced concrete can be devoted to users where there is no alternative" (IUFRO 1976a, p.272).

In the concluding part of the session, the floor was given to the legendary Dr. Thor Heyerdahl,

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[205] He meant the first report: *The Limits to Growth* (1972), and the second one: *Mankind at the Turning Point* (1974) to the Club of Rome.

[206] The Hudson Institute, founded by Philosopher and Futurologist Herman Kahn, published its *The next 200 years: A scenario for America and the world 1976*, to mark the 200th anniversary of the USA.

Colla Micheri, Laigueglia, Italy, who delivered his address: *Man and Forest: A Time Perspective.* As an anthropologist, he noted that the recent historical period saw increased proactivity of Man towards Forest. In 1936 when he had chosen to become a geographer, he had wanted to settle with his fiancée in forests of Polynesia, thousands km from the Western civilization, and undertake an anthropological experiment with returning "to man's original life in nature, barefoot and empty-handed, to probe the obstacles and benefits of primitive life without a cash economy, without modern provisions, tools, and medicine" (IUFRO 1976a, c.280). Dr. Heyerdahl described lots of forest plants and trees, including fruit trees, which they had used in Fatu-Hiva and Thaiti, and noted that, as a biologist, he was keen to understand "nature's fundamental law of equilibrium between the species - wherever there is a tendency to dominance of any one breed, an abnormal number of a hostile species is automatically produced to cut the excess down to proper level" (ibid., p.283). Then, he talked about the use of forest species in shipbuilding in different times in Egypt, Libya, Greece, Crete, Easter Island and other parts of the world, and about forest fire and reforestation.

At the Congress, the first fiddle in discussions was played by the sub-plenary sessions, with each of them to be focused on a preliminarily defined common or most interesting problem for a given Division. But they discussed, mostly, organizational matters such as reports for the previous five years, election of chief officers for units and working parties. Such meetings also included presentations of scientific papers.

At the session of IUFRO Division I, L. Overrain (Norway) presented his paper about precipitation acidity and its impact on forest ecosystems. The session of IUFRO Division III heard papers about the place of human beings in the production system, i.e., about the role, of Man as worker, administrator and investigator.

The plenary session of Division 4 included the reading of the report of G.I. Vorobyov, Chairman of the USSR State Forestry Committee, titled: *Silviculture in Planned Economy*. Division 5 organized sort of a symposium on requirements to wood properties for various practices of wood processing. Division 6 heard a paper about systems analysis in forest research (J.N.R. Jeffers, England) and a report about forest research management (D.L. Bosman, South Africa). But the main discussions were centred in the meetings of working parties which heard, as a rule, preliminarily submitted and published papers (or their abstracts) and additional papers[207]; and the latter ones were most often distributed as reprinted copies[208]" (Уткин, Кайрюкштис, Протопопов 1977, p.96).

According to the Congress Report, there were 324 discussion papers, and significant time was allocated for reports of the Divisions about the work done during the five years (IUFRO 1976a). Recognizing the fairness of the critical remarks of the authors of this article who participated in the Congress, representing our country, it should be, nevertheless, noted that IUFRO Congresses paid much attention to the evaluation of the work done, among other things, to demonstrate achievements of international cooperation which was the overarching goal of IUFRO's establishment.

For this reason, any Congress Report enables the Union to show its activities and achievements from different perspectives: its internal structure (e.g. division into groups) and its modifications, issues under discussion (with their scope and depth), the number of research workers, international cooperation (joint work, conferences), publications (what and when), plans. etc., so that IUFRO could be seen as a living entity with all its strengths and weaknesses, continuously addressed by the Union.

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[207] "Published papers of the Congress were included in respective volumes, by IUFRO Division: the XVI IUFRO World Congress. Div. I, 780 p., Div. II, 578 p., Div. III, 355 p., Div. IV, 444 p., Div. V; 234 p.; Div. VI, 337 p." [the footnote of the authors of the publication about the Congress – V.T.].

[208] "There were 417 additional papers. They were listed for each Division in the Final Congress Report" [the footnote of the authors of the publication about the Congress – V.T.].

Division 1 *Forest Environment and Silviculture*. During the period between the Congresses, the Division held four conferences with the attendance, ranging from 100 to over 200 people from 22-26 countries; prepared a list of cooperating scientists; continued to finalize its internal structure: organized 5 Subject Groups to fit into the new structure and numeration of the groups, existing till the present time.

Subject[209] groups (S1.01… S1.08) presented the reports of their Working Parties: S1.01.1 (Virgin forests); S1.01.2 (Silvicultural problems in mountain regions); S1.02.1 (Fertilization); S1.02.2 (Soil moisture regime and aeration of soils); S1.02.3 (International methods for chemical analysis); S1.02.6 (Site classification); S1.05.1 (Afforestation of peatland and extremely wet soils); S1.02.7 (Quantitative studies of site factors), e.g., this WP included 77 scientists from 26 countries; S1.03.1 (Atmospheric environment); S1.04 (Torrens, snow, avalanches, 85-174 scientists from 21 countries); S1.05.8 (Natural stand regeneration, 67 scientists from 25 countries – on regular members, and 26 scientists from 12 countries as interested members); S1.05.3 (Treatment of young stands, 112 scientists from 25 countries); S1.05.4 (Characterisation of plant material, 77 scientists from 25 countries); S1.05.5 (Thinning experiments, 41 scientists from 18 countries); S1.05.6 (Silviculture of multiple-use, 203 scientists from 34 countries); S1.05.9 (Coppice, 40 scientists from 15 countries); S1.07 (Tropical silviculture); S1.07.1 ...in Africa; S1.07.2 ... in Central and South America; S1.07.3 ... in Asia; S1.08 (Wildlife habitat management), etc.

In particular, meetings of Subject Group S1.08 were focused on influence of "various silvicultural operations (clear-cutting, made-made burning, etc.) on the populations and habitats of game animals (R.C. Steele, England: E.S. Tefler, USA; E.Bunnell, D.Eastman, Canada; J.G. Nagy, USA; S.D.Schmenitz, USA) and habitat classification for game management purposes (J. Kikkawa, Australia; L.W.Krelting, USA, and J. Lykke, Norway; T. Riney, England)" (Уткин, Кайрюкштис, Протопопов 1977, p.98).

In addition a new project[210] group was organized under Division I - P1.04 (Forest nurseries) and included about 100 scientists from 30 countries.

Naturally, the groups varied in the scope and volume of completed work, their interest for the research community, etc., but the reports reflected the most important areas of forest research for that time. E.g., 83 discussion papers were submitted to the Division for review.

According to representatives of the Soviet delegation, they were somewhat surprised with the insufficient attention of the Congress to forest ecology which was increasingly leading in the system of biological sciences. Therefore, the studies, presented at the Congress under the Subject Groups on Ecosystems and Biological Productivity, could be hardly classified as ecosystem studies: the Subject Group was focused on mountain silviculture and forestry, conservation of virgin forests and their management. And the meeting of the sub-group on biological productivity (under the same group) had the lowest attendance. The paper, prepared by G. Krumlik and J.P. Kimmins (Canada), contained data on the above-the-ground plant biomass in two mountainous dark coniferous stands, aged 250 and 420 years and on the contents of N, K, P, and Ca, in different plant organs. The data served to estimate plant biomass and macro element utilization under the following harvesting scenarios: (a) removal of stems with top diameters >2.5 cm and branch diameter >2.5 cm; (b) the same, but only for stems; (c) the same, but only for wood, debarked in the cutting area (Уткин, Кайрюкштис, Протопопов 1977, p.97).

Representatives of the Soviet delegation also noted that the Working Party on Habitat not only studied habitat-related factors and their classification (D. Burger, Canada; G. Schlenker, K.

[209] "S" means Subject and used to denote Subject Groups.
[210] "P" means "Project" in the names of project groups.

Kreutzer, West Germany; B.C. Steinbrenner, USA), forest use impact on soils and water quality in rivers (J. P. Kummins, M.C.Feller, Canada; N.V. DeByle, USA), but also paid much attention to forest fertilization. This area was highlighted in an interesting overview, made by B. Ulrich (West Germany) and one paper (J. Van den Burg, Netherlands), evaluating the existing diagnostic methods for mineral nutrition in trees. J. Van den Burg reviewed a huge amount of evidence and showed that foliage analysis data could be used erroneously. He underlined the need to unify diagnostic methods as decided at the FAO and IUFRO symposium in Paris (1973), to standardize methods of soil and tree sample collection to establish a data bank for soil analysis and foliar diagnosis. The paper of G.F. Schreuder and B. Bruce Bare (USA) highlighted mathematical modelling for assessing forest land productivity. Integrated assessments were not yet achievable, but satisfactory individual models were available for analysing selected processes and conditions of forest ecosystems.

J.P. Kummins and M.C. Feller reported about case studies in dark coniferous stands, aged 60-90 years, near the City of Vancouver. According to their data, significant leaching of nutrients had been found in a watershed with clear cutting of a stand and in a watershed with clear cutting and slash-disposal burning, compared with the control watershed. However, the overview, presented by N.V. DeByle, showed the impact of forest fire, clear cutting and slash disposal burning on the soil; and alongside with adverse impact cases, it described cases of insignificant anthropogenic impact on the environment. He concluded that it was accounted for by the differences in forest site conditions.

Special efforts were required for mountain forests where managerial and other impact increased erosion, provoked landslide, and intensified movement of snow avalanches; and they were discussed in a number of papers about Alpine forests (G. Kronfelder-Kraus, Austria; H.R. Inder Gand, Switzerland; I. Merwald, Switzerland), mountainous forests in Turkey (F. Tavsanoglu), Japan (H. Ishibashi), USA (D.N. Swanston), etc.

No brand new data on forest hydrology were reported. It is noteworthy that forest hydrology studies were integrating with geochemical research. Therefore, alongside with hydrological budgets, budgets of macro elements were produced (H.M. Keller, Switzerland, etc.). Traditional meteorological ingredient observations tended to be integrated with physiological studies, among other things, for purposes of assessing the biological productivity of forests with the use of the method of estimating the air CO_2 budget in the canopy. Those aspects were covered in a number of papers (P.J. Jarvis, USA; R.R. Strain, K. O. Hyggonbotham, USA, Canada; H. Hager, Austria).

K.S. Sheperd (USA) reviewed physiological aspects of annual production and wood quality, with a focus on cambium; biomass production in the forest as a whole; prospects for genetic changes and propagation of elite forms; influence of forest management activities on the growth. He concluded that breeding-based methods could be used to increase the productivity of tree stands, but only through improving the wood quality; at the same time, fast introduction of genetics in silviculture was limited with technology of cultivation of hybrid plants. According to available data, silvicultural treatments (thinning, fertilization, spacing, pruning, etc.) could increase the yield of tree stands, but data on the quality of wood was very controversial.

Since the aim was to cultivate elite planting stock from seeds, collected in seed orchards, there was a complicated problem, arising from the impossibility to have expected seed harvests in orchards. Such important issues were identified in the paper, prepared by S.L. Krugman (USA) who urged to pay special attention to physiological processes of fruition, as well as in papers of E. Merkel (USA), E. Annila (Finland), H.O.Yates (USA) about seed and fruit pest control in seed orchards (ibid., pp. 96-97).

Division 2 *Forest Plants and Forest Protection* had rather high representation. According to different sources, as the Congress dates, from 3,000 to 4,000 scientists from 80 countries cooperated

in 14 subject groups and 67 working parties[211] of this Division. It received 104 discussion papers for the Congress. The Division included the following subject groups: S2.01 (Physiology); S2.02 (Species, provenance and gene resources); S2.03 (Breeding); S2.04 (Genetics); S2.05 (Genetic resistance to insects and diseases); S2.06 (Pathology); S2.07 (Entomology); S2.08 (Damage by vertebrates); S2.09 (Air pollution); S2.10 (International rules on plant material); and S2.11 (Pesticides). In addition, the Division had three project groups: P2.01 (Interaction between site factors and destructive agents, 174 scientists from 34 countries); P2.02 (Production of high yielding trees); P2.03 (Impact of destructive agents).

To perceive the complexity of the IUFRO structure after the reorganisation, it would worthwhile to look only at one subject group, e.g., S2.01 (Physiology) had nine working parties: S2.01.01 (Water relations and mineral nutrition); S2.01.02 Photosynthesis and metabolism; S2.01.03 (Physiological ecology); S2.01.04 (Growth processes) [212] ; S2.01.5 (Reproductive processes); S2.01.6 (Seed problems); S2.01.7 (Mycorrhizae); S2.01.8 (International Directory of Woody Plant Physiologists)[213]; S2.01.9 (Roots, growth morphogenesis, and relationships with the shoot and the soil).

As noted in the overview, prepared by Soviet participants of the Congress, the most extensive coverage of the ecosystem approach to research was provided at meetings of the forest entomology subject group. "It was directly reflected in papers of J.P. Vite (West Germany), W.Waters (USA), in papers about the dynamics of insect pest populations and their control (W. Baltensweilr, Switzerland; G.C.Varley, Great Britain; V.Labeyrie, France; H.Eidman, Sweden; C.D.Amman, USA), in models of insect populations (A.S. Isaev, R.G. Khlebopros, USSR; E.W. Cole, USA; A.A. Berryman, USA).

During the entomological discussions, much attention was paid to the biology of bark beetles (*Dendroctonus)* and weevil (*Hylobius abietis*) and their control.

Many papers on forest genetics and breeding were focused on analysing experiments with provenance study plantations of various tree species (especially Sitka spruce, Norway spruce, larch, etc.,), established in different countries under the IUFRO program, as well as artificial hybridization of trees. Hereditable resistance of some tree species populations to fungal diseases, insect pests and chemical emissions was also extensively discussed" (Уткин, Кайрюкштис, Протопопов 1977, p.97-98). It should be noted that papers, e.g., about multiple forest use in Hungary, showed significant interest to the economy of socialist countries (Cornides, Keresztesi 1977).

Division 3 *Forest Operations and Techniques*. Discussion papers were few (36), but scientists from this Division were active in many countries. It was owing to their efforts that the present-day silviculture has so significant knowledge in this area. An advantage of this Division consisted in the opportunity to collaborate and work in several working parties at the same time, linking seemingly isolated issues. For example, 196 scientists from 33 countries cooperated under Subject Group S3.01 (Harvesting and transport) though each working party had fewer countries, but more representatives from other working parties. E.g., working party S3.01.1 (Harvesting under non-mountainous conditions) included 95 scientists from 22 countries; other examples were: S3.01.2 (Harvesting in mountainous regions, 87 scientists/20 countries); S3.01.3 (Harvesting in tropical forests, 24 scientists/14 countries); S3.01.4 (Long-distance transport of wood products, 49 scientists/20 countries); S3.01.5 (Forest roads, 65 scientists/23 countries).

Other subject groups of the Division were similarly arranged: S3.02 (Operational methods in

[211] A Working party is the smallest unit in the IUFRO, functioning on a permanent basis and conducting core work.

[212] In parallel, another group was working - S2.01.04 Growth Processes, Xylem Physiology.

[213] The Directory contained names of specialists from 65 countries in all the 5 continents. It was published in May 1974 (Horsley and Weldon 1974).

the establishment and treatment of stands, 72 scientists/22 countries); S3.03 (Ergonomics, 105/28); S3.04 (Operational planning and control; work study, 129/27). In addition, the Division included three project groups: P3.01 (Harvesting and wood utilization, 55/17) and P3.02 (Accessibility of forest resources, 15/5). Together with Division 4, it established project groups P4.01 (Thinning and mechanization) and P4.02 (Economics of harvesting and thinning, 72/24), and many scientists from this Division collaborated under project groups, established by other Divisions which was a common practice, welcomed by the Union.

Both group meetings and other sessions had many papers, evaluating forest silvicultural operations with a focus on final cutting, thinning and forest plantations. These issues were reviewed from different angles, including the intensity of their environmental impact and influence on the health of the remaining part of the stands (in the case of thinning), feasibility of technical schemes of thinning in mountainous and flatland forests in large regions, and ergonomics. It was noted that approaches to thinning and stand fostering were better addressed in European countries which had already elaborated guiding principles of stand cultivation after thinning. Nevertheless, the authors of the papers about effects of various thinning practices on productivity (G. L. Hamilton, England) and about tree and soil damage (H. Froehlich, USA) expressed concern about lack of studies in these areas (Уткин, Кайрюкштис, Протопопов 1977, p.98).

The Division also cooperated with such international organisations as the FAO, ISO, ILO and the Joint FAO/ECE/ILO Committee.

Division 4 *Planning, Economics, Growth and Yield, Management and Policy* collected 76 discussion papers. However, this Division was one of the most active in Union not only during the previous, but also during many decades to follow. Subject Group S4.01 (Mensuration, Growth and Yield) alone had 600-800 members in five working parties and only in 1974; it had issued three important publications: (i) *Mensuration of Forest Biomass*, (ii) *Contributions to Increment Research – Estimation of Increment*, and (iii) *Growth models for Tree and Stand Simulation*. Group S4.02 (Forest resource inventory) included four working parties, engaged in research in this area, consisting of 50-75 members from 20-25 countries each. This Division also included the following subject groups: S4.03 (Managerial economics, 75 scientists/12 countries); S4.04 (Forest management and planning, 121/35); S4.05 (Economics at national and international level) which worked in close cooperation with S1.03, S3.01 and S3.02 to address bibliography, labour productivity, etc.; S4.06 (Forest policy) which had the greatest number of members - 227.

An overview of methods to estimate biomass and annual yield of a tree stand was made by H.A.I. Madgwick from New Zealand. He noted that among model trees, the best results had been found in the case of regression fitting with the use of the basal area or the product of the squared stem diameter by the height as independent variables. At the same time, to produce reliable estimates of the weight of crown fractions, it was necessary to take crown branches' positons into account; to estimate the weight of stem fractions, it was necessary to use radial increment for the recent decade. As for the techniques of sampling and defining the number of needed model trees, they remained the least developed in such studies. There was a special working party to address stand increment dynamics. Interesting papers were the overview of methods for increment studies, made by J. Pollanschutz (Austria), and the paper of H.L. Wright (England) about models of tree and stand growth, including growth tables. F. Hegyi (Canada) shared his experience with computer-based modelling of forest tree resource use in British Columbia. The recreational use of forests was discussed from economic perspectives. (A.L. Lundgren, USA; W.R. Burch, USA; H. Kenneweg, H. Pabst, West Germany; W. Johnston, G. Elsner, USA; E. Gundermon, West Germany; O. Holstad, Norway) (Уткин, Кайрюкштис, Протопопов 1977, p.97-98).

The five project groups included more than 600 members. E.g., Project Group P4.01 (Economic, technological and environmental aspects of wood substitutions) consisted of 100

scientists; P4.02 (Economics and harvesting of thinning) had a total of 260 members from 40 countries, and was supported by two working parties, dealing with thinning mechanization and economics of spacing and thinning; P4.03 (Economics of recreation) had 40 members from 10 countries; P4.04 (Economics of afforestation and reforestation) was organised during the Congress; P4.05 (Concepts in inventory, management, planning and economics of forestry) included 170 scientists, but had not started functioning in full swing; P4.06 (Forestry and human environment) consisted of 30 scientists.

Division 5 *Forest Products* was actively cooperating with international organisations (FAO, UNCHEBP, UNIDO) [214] and the Canadian Government. In 1971, the Division held a joint multilateral consultation in lost-cost housing for developing countries; in 1973, it held a mini-congress on the theme *Wood in the Service of Man* in South Africa; and in 1974, it held an organisational and technical meeting under the South African Congress. As a result, a new subject group was established, but in Division 6 - S6.06 (Research and development management).

The Division collected 66 discussion papers for the Congress from its four subject groups: S5.01 Wood quality; S5.02 Wood engineering; S5.03 Wood in storage; and S5.04 Wood processing. Looking at the papers of Division 3, one could see that similar papers were presented by Division 5; in particular, about maximized utilization of wood and its properties, including wood from thinning and unmarketable wood. Apart from the multifaceted analysis of the main function of forest to supply wood, the Congress had a broad discussion of non-wood forest resources and benefits, i.e., multiple forest use (Уткин, Кайрюкштис, Протопопов 1977, p. 98).

Division 6 *General Subjects* had a rather ramified structure, covering about 600-700 research workers from more than 40 countries and addressing many issues which were beyond the scope of any other Division.

The Division was active both in terms of research work and publishing activities: it published five fairly noticeable books: (1) Proceedings of the IUFRO Subject Group Symposium: Remote Sensing, including Aerial Photography (Hildebrandt 1973) under the leadership of S6.05: Remote sensing; (2) the French version of the Multilingual Terminological Dictionary (Métro 1975), as approved by the FAO/IUFRO Joint Committee on Bibliography and Forest Terminology under the the leadership of S6.03: Information Systems and Terminology; (3) publication of the History of Forestry in the January issue of the Swiss Forest Journal (S6.07 Forest history, 1974); 4) a few issues of the *Bulletin*, a rather popular periodical (S6.02 Statistical methods, mathematics and computer); and (5) Proceeding of the first meeting of Subject Group S6.06: Management of forestry research.

The Congress received 54 discussion papers. For example, use of forests for recreation purposes was discussed at the meetings of Subject Group S6.01. It is worthwhile to refer to the opinion of our delegates about forest management and planning for recreation in the context of landscape planning and management (H. van Lier, Netherlands; B. Driver, G. Stankey, P. Brown, USA; H. Kopp, West Germany, and N. Stout, USA; R. Zindel, West Germany; J. Neutze, Netherlands): "Since forest recreation has been addressed in West Europe and North America for a longer time than in the USSR, some of their practices could be, clearly, used in our country" (ibid., p.98).

Later, this Division will 'generate' new Division 9[215], to address forest policy and economics.

Summarizing their impressions about the Congress, members of the Soviet delegation noted: "The Congress did not present any brand new trends in silvicultural research though it identified some issues which should be more actively addressed by forest research institutions in the USSR. At the same time, there is a tendency towards increasingly broader application of systems analysis and mathematical modelling to investigate various natural processes, to evaluate impact of different

[214] UNCHBP means the United Nations Centre for Housing, Building and Planning; UNIDO means the United Nations Industrial Development Organization.
[215] It was established at the IUFRO Congress in 2010 (Seoul, Republic of Korea).

management activities on the forests, etc. Research is becoming predominantly integrated and is drawing upon up-to-date devices and equipment with automated recording of observation results. Employment of modern equipment and devices and broader reliance on mathematical methods make research work increasingly prompter" (Уткин, Кайрюкштис, Протопопов 1977, pp. 96-97).

Organizational matters

During the Congress, the International Committee had two meetings, attended by representative from 54 out of 65 member countries. By unanimous vote, the International Committee approved the two nominations for Honorary Membership in IUFRO: Professor Ivar Samset (Norway) and Professor A. Oudin (France) who had been active in IUFRO for over 30 year (1928-1958).

At the last plenary session of June 26, 1976, President I. Samset presented his report about the Congress and provided much interesting information, including the age of the Congress participants, which showed an ideal "normal distribution" by the age group: 20-23 years old (7%), 30-40 (27%), 40-50 (33%), 50-60 (24%), 60+ (9%); and the average age was 45 years, ranging from 38-40 years for Africa and South America to 48-51 years for North America and Eastern Europe. In relation to the IUFRO structure adopted at previous Congress, the representation of the delegates by Division was as follows: Division I – 248 people; II - 236; III - 130; IV - 208; V - 144; and Division VI – 99 people, totalling – 1,065 people.

"The relative distribution of the participants on the various Divisions may reflect the importance laid on the different forestry sciences in the various regions. Divisions I, II and IV were attended by approximately 1/5 of the participants each and there was little variation between the world regions. The attendance in Division V was a little bit lower. This is probably due to the fact that the scientists on forest products have the possibility of cooperation within other international organizations[216]. Forest operations is a relatively new science in forestry and is more developed in countries with balanced forestry than in regions where forestry takes care of the growing stock only and the harvesting is left over to the industry" (IUFRO 1976a, p. 83).

During the reporting 5-year period, the number of member organisations increased which resulted into an increase in the Union's budget approximately by one third to reach CHF 326,000 per year (versus CHF 231,000 in 1971). The Austrian Government had allocated CHF 111,000 per year or 49% of the total Secretariat expenses. Norway had also supported IUFRO's work by CHF 300,000 to cover expenses at the President's office and CHF 700,000 as a direct support to the 16th IUFRO World Congress[217].

In addition, the Norwegian Agency of Foreign Development had given IUFRO (NORAD)[218] CHF 250,000 to finance scholarships for 55 young research workers from developing countries, and 50 of them attended the Congress (IUFRO 1976a, pp.303-304). So, Norway had supported IUFRO with CHF 1.25 million during the past five years.

The increased number of members, broadened scope of provided services, launched publishing of the IUFRO News (since 1972) and other activities of the Union required adequate financial support for its Secretariat. In view of that as well as taking into account the support, provided by various countries and organisations, the general inflation, it was decided to increase the basic annual subscription for Member Organizations from CHF 100 to CHF 200. The international

[216] E.g., the International Academy of Wood Science.

[217] However, the bulk of expenses were covered by participants and sponsors of the Congress. In particular, depending on the due dates of registration fee payment, the fee ranged from US$ 300 to US$ 400. Pre- and post-Congress excursions were, as a rule, paid for by the participants. In Norway, their prices ranged from US$ 200 to US$ 350.

[218] Now: NORAD or Norad – the Norwegian Agency for Development Cooperation. In those years: the Norwegian Agency of Foreign Development.

Council also delegated to the Executive Board to increase the subscription rate per 10 research workers from CHF 100 to CHF 125 if they find it necessary.

The language problem was given special attention by the International Council and it was aware that the use of many languages would require adequate financial support. Recognizing that the Union's financial possibilities had serious economic limitations, the Council decided that the Union should continue with three official languages, English, French and German, with English as the main language. Nevertheless, the Union would continue to publish documents of organizational importance like the Annual Report, Statutes, Internal Regulations, etc. in the three languages. Informative material might be limited to the main language while scientific material might appear in one of the three languages, preferably, with summaries in the two other languages (IUFRO 1976a, p.85).

The Council accepted a formal invitation from the Japanese Forest Agency to hold the next IUFRO World Congress in Tokyo in 1981.

To address the Union's program, the floor was given to Vice President Douglas Redmond who was the Chairman of the Programme Committee during the past five years. He summarized the highlights of the Union's program and challenges for future, pointed to the enhanced international role of the Union in view of its greatly increased membership; and informed the audience that in the period between the Congresses, IUFRO had organized or participated in the preparation of 125 research conferences, and its representatives attended meetings of the FAO, UNESCO, ECE, ILO and other institutions as participants or observers.

After the reorganization of 1971, IUFRO's research program had taken major steps forward, especially, in such research areas as forestry in the human environment, in particular, in the study of arboriculture and urban forestry, and mitigation of effects of chemicals used in pest control. The speaker said that the obvious areas, demanding immediate attention, included: contribution of forest products to the solution of energy problems; problems in small woodlots or forested areas that were part of agricultural systems - now known as agro-silviculture; and, another example was the enormous contribution that could be made by tropical forests to the wellbeing of the local people. Furthermore, results should be made available for application immediately (IUFRO 1976a, p. 87).

Dr. Redmond explained the principle of Subject Groups and Project Groups as follows: "1. A Subject Group includes research on a specific discipline - broad and narrow - that is of a continuing nature; and 2. A Project Group - a) provides an opportunity for scientists in two or more Divisions to work together to solve problems that involve these Divisions, or b) permits a number of scientists within one Division to solve an important problem within a short term, for example, before the next Congress." In addition, the smallest units were, as earlier, working parties (groups), undertaking specific studies (IUFRO 1976a, p.338).

To provide uniformity, the IUFRO Programme Committee prepared Guidelines for IUFRO Publications and Guidelines for planning a IUFRO Conference as well as a World Directory of Forest Pathologists and Entomologists that included 1,200 names (Anderson and Batzer 1976)[219].

The Joint FAO/IUFRO Committee on Bibliography and Terminology finalized multilingual Guide on Terminology of Forest Science, Technologies, Practices and Products (Terminology of Forest Science, 1971) which included over 6,800 terms and definitions and by mutual agreement of the FAO and IUFRO, the Committee was abolished.

As a rule, each Congress approved the establishment of new working parties, including those created by and between Congresses and during a Congress. The 15th Congress was not an exception and established a number of subject and working groups. At the first meeting of the Programme Committee, 38 Subject Groups and 13 Project Groups were consolidated and three new Subject Groups were set up: on Education and training of research workers and on Forest management and

[219] See Skilling and Batzer (1995).

planning, and on Pesticides, as well as five new Project Groups: Arboriculture and urban forestry, Impacts of destructive agents, Accessibility of forest resources, Concepts in inventory, management, planning and economics of forestry, Forestry and human environment.

In parallel with the creation of new groups, other groups were abolished or restructured. Project Group on Technology was abolished, but it provided a basis for putting together a new, broader Subject Group on Information systems and terminology. Thus, by the end of the reporting period, the program had 41 Subject Groups and 17 Project Groups.

The changes were made in response to requests from other international agencies such as the FAO and UNESCO's MAB programme or to meet the increasing demands, placed on forest managers and forest scientists with the emphasis on environmental problems and increased human activity in forestry and on forested lands (IUFRO 1976a, p.340).

In his report, IUFRO Secretary Otmar Bein talked about the history of the Secretariat: the first Chairman of the International Union (Josef Friedrich) as the Chief Forester, could base the Secretariat in his own office at Mariabrunn, near Vienna. All his successors followed that rule, until after the last pre-war Congress in 1910. After World War One, since 1925, the Union started to restore its ruined contacts. As a result of the reorganisation in Stockholm (1929), the Secretariat moved to Sweden. Dr. Sven Petrini was elected General Secretary, and the Secretariat, under his guidance, enabled IUFRO to grow to become an important forest research organization.

World War Two suspended the work, but it was owing to Petrini that the Union resumed its functioning per request of its members immediately after the war to the extent possible "in the generally chaotic state of the post-war world" (IUFRO 1976a, p.347).

When the Agreement between the FAO and IUFRO was signed, the Secretariat moved to Rome where it started operating since 1949, and S. Petrini retired after more than two decades of work. In different years, the IUFRO Secretariat was headed in succession by R.G. Fontaine, I.T. Haig and L.J. Vernell. A few years later, the FAO and IUFRO deemed the situation unsatisfactory and decided to invalidate the paragraph about the Secretariat in the Agreement since 1957.

In that situation, James McDonald, IUFRO President (1957-1961), elected in 1956, transferred the Secretariat to his office in London as he had such an opportunity as an officer in the Forestry Commission, and his example was followed by other Presidents: J. Speer (1962-1967) in Munich and G.M. Jemison (1968-1971) in Washington, D.C. The movement of the Secretariat and rapidly growing volumes of the Union's archives, coupled with complicated work and other factors, necessitated the establishment of a Committee, headed by Vice-President I. Samset to consider the Union's restructuring. Such a committee was set up in 1967. At the Congress in the USA in 1971, it was decided to restore a permanent Secretariat of IUFRO (IUFRO 1971, 1976a).

It was intended to find a 'home' for the permanent Secretariat in Great Britain, Germany or Switzerland. There were various reasons for the failures to implement those proposals. According to a document (IUFRO Communication 1972), IUFRO President I. Samset informed the Union that to follow the decision of the Executive Board (Warsaw, February 23-28, 1972), he and Vice-President D.R. Redmond visited Austria and Switzerland to explore the possibilities to open an office of the Secretariat. They assessed 17 premises. It turned out to be impossible to accommodate it at the Forest Research Institute in Birmensdorf, Switzerland for reasons, related to the Swiss legislation, and Switzerland's financial conditions. The Austrian Federal Research Institute of Forestry (Schönbrunn, Vienna) offered to home the IUFRO headquarters on very good conditions. So, in 1973, the IUFRO Secretariat moved to Vienna in accordance with the agreement of June 26, 1973, between the Austrian Government and IUFRO about the permanent Secretariat, signed by Austrian Minister of Forestry and Agriculture Oscar Weiss and IUFRO President Ivar Samset (IUFRO Communications 1972, IUFRO 1976a, Schmutzenhofer 1996a, IUFRO News 1998) where it has been based since then.

The concluding session adopted the Congress Resolution and new office-holders were elected. The International Council elected Professor Walter Liese, Germany, as the Union's President (1977-1981), Professor Taisitiroo Satoo, Japan, as the Union's Vice-President as well as its nine members, representing different regions, six Divisional Coordinators and two President's Nominees to the Board Membership (Professors N.A. Moiseev from the USSR and U. Sundberg from Sweden).

Otmar Bein (Austria) remained the IUFRO Secretary. K.F.S. King, Deputy Director General, FAO, and M. Matsui from the Government Forest Experiment Station, Japan, received the status of observers. It should be noted that Professor N.A. Moiseev was among the candidates for the office of IUFRO President (Уткин, Кайрюкштис, Протопопов 1977).

In his programme speech, President-elect W. Liese said: "Scientific cooperation really is the basis for IUFRO's future, and IUFRO can only be as vigorous as its research groups are active. I therefore request all leaders of the Subject and Project Groups and of the respective Working Parties to show goodwill and active cooperation in performing their functions. The work in IUFRO will only be good if the individual scientists are willing to contribute towards common goals. Scientific cooperation within IUFRO is a promising possibility, and we should call it our task to prove that this is the best way for performing our scientific work" (IUFRO 1976a, p.101).

Professor W. Liese stressed the need for close cooperation with the FAO and other international organizations to implement interdisciplinary projects and involve young research workers: "The future of IUFRO has certainly its roots in the past; when it was founded 1891, its objective was stated as 'Zweck des Verbandes ist die Forschung, Weiterbildung und Vervollkommung des forstli chen Versuchswesens', ('the aim of the Union is to promote and perfect forestry research work'). This will be our goal also for the coming period" (ibid., p.102).

After the speeches of Ex-President G.M. Jemison and Out-Going President I. Samset, the Congress was closed.

Resolutions

The 16th IUFRO World Congress adopted the following recommendations:

"The continuing management of forests as a renewable resource is essential to safeguard the standards of living the quality of life of future generations. Being mindful that the theme of this Congress is *Forestry in a World of Limited Resources*, and being aware of the possible implications of the rapidly increasing demand for wood in the world on the environmental and social functions of forests, the XVI IUFRO World Congress recognizes that:

WHEREAS the population of the world is increasing rapidly and thereby placing greater demands on all forest resources in particular for the provision of paper, fuelwood and wood for housing;

WHEREAS the increased population is placing greater demands on the land to produce food crops and, as a consequence, is continuing to remove land from forest production;

WHEREAS many developing and most developed countries are experiencing conflicts between wood production, recreation, amenity, protection and conservation and;

WHEREAS the yield of most of the world's forests is much less than the site potential;

BE IT RESOLVED THAT

a) There is a great potential for increased wood production by extending plantation forestry, by reducing waste, and by utilising a high proportion of the available biomass more efficiently, by improved operational efficiency, and by more systematic management of existing forest resources;

b) Organised research programmes and implementation of research findings can contribute in a major way to improvement of the forest resource and its utilisation and to meet the growing demand on the forest for wood and wood products;

c) That in future research, special emphasis be given to the needs of developing countries. IUFRO should make every effort to include studies of problems relating to developing countries in their programmes and to involve scientists from developing countries.

LAND-USE POLICY

WHEREAS policy and management practices have to be based on subjective assessments of benefits to the societies concerned, it is essential that forestry be integrated into planned land use and there is therefore a need for objective criteria to assess its relative merits.

BE IT RESOLVED THAT

a) As an aid to the selection of appropriate forest and forest industry policies and practices, research is needed on the evaluation of the actual and potential contributions of forestry and forest industries to society.

b) Objective criteria are essential for balanced decision making and more research is needed into criteria and systems of land classification for forestry and other uses covering all aspects, physical, economic and social.

FOREST RESOURCES

WHEREAS with the continuously increasing demand for wood and the depletion of forest land for food production and other uses, a prime need in future is to increase wood production from a reducing forest area.

BE IT RESOLVED THAT

a) Research should be directed to facilitate more accurate assessment and monitoring of the world's forest resources, their accessibility and their potential to meet human needs.

b) A world-wide study of forest lands and ecosystems is needed to provide information on their carrying capacity under various exploitation and management methods.

WHEREAS some forest areas have, by prodigal exploitation, been reduced to worthless scrub or coppice which nevertheless is capable of conversion either to agriculture or to productive forest.

BE IT RESOLVED THAT

Development of silvicultural techniques for conversion, regeneration and enrichment of such areas needs to be intensified.

WHEREAS the afforestation of wasteland, non-forest land and abandoned agricultural land can contribute greatly to increased wood production, and advanced silvicultural techniques have been developed, especially in temperate regions, for afforestation.

BE IT RESOLVED THAT

In the tropics further research is needed to develop appropriate silvicultural and operational techniques of afforestation.

TREE IMPROVEMENT AND PROTECTION

WHEREAS tree breeding is an important means of improving the growth and health of forest land. Much has been achieved through provenance research, selection and hybridisation, especially in temperate regions. In the tropics and sub-tropics, research has so far concentrated on eucalypts, pines, teak and a few other hardwoods.

BE IT RESOLVED THAT

Increased efforts are required to establish international cooperation in breeding for high yield and disease resistance.

WHEREAS the increasing use of planting material of known provenance requires a guarantee of the identity of each lot of seed or plants; this in turn means a system of control and certification. Schemes such as that of OECD for controlling the movement of forest reproductive material are indispensable for making available the best possible planting material for the forests of the future.

BE IT RESOLVED THAT

All countries are urged to support such arrangements for movement of forest reproductive material.

WHEREAS forests may be subject to various forms of long and short term deterioration caused by man's activities as well as by natural causes.

BE IT RESOLVED THAT

All countries place adequate emphasis on forest protection research to guarantee sustainned forest production, and research needs to be intensified in tropical regions.

WHEREAS the risks and dangers arising from the transport of harmful insects and diseases from one continent to another are enormous and constant care needs to be exercised both by governments and scientists.

BE IT RESOLVED THAT

Steps should be taken to stimulate research on quarantine procedures and assists in developing and standardising import regulations.

PLANNING AND FOREST OPERATIONS

WHEREAS new operational methods that increase productivity can reduce or at least hold costs and much is being achieved for largescale operations.

BE IT RESOLVED THAT

More research is needed in particular for small-scale operations as, for example, where the size of land unit, terrain or silvicultural considerations limit the scale of work.

WHEREAS the development of new operational methods and machines has reduced manual workloads, but the forest worker is faced with new stresses such as vibration, noise and chemical pollution.

BE IT RESOLVED THAT

a) Improved methods must be developed the better to adapt machines to the human individual to reduce accidents and to reduce environment pollution.

b) In research involving the use of chemical compounds in forestry, it is essential that health hazards to workers and to the public be properly investigated, drawing on medical expertise to ensure that safe work procedures are defined and made known.

WHEREAS it is estimated that 25% of forest land is located in mountainous regions, with steep and difficult terrain.

BE IT RESOLVED THAT

Increased research is needed to improve operational efficiency in these conditions.

WHEREAS some forest machinery can cause damage to standing trees or the site, particularly, in logging operations.

BE IT RESOLVED THAT

Research should be aimed at devising machinery and methods which minimise site damage, safeguard the soil, landscape, recreation values and nature conservation.

WHEREAS stumpage systems of timber sales are widely used and forest management may be adversely affected due to the conflict of interest that can arise between the forest owner and timber buyer.

BE IT RESOLVED THAT

Studies of administrative systems are needed in order to secure a better reconciliation of the needs of forest management and the needs of commercial logging.

FOREST PRODUCTS

WHEREAS the properties and utility of wood can be greatly influenced by forest management decisions and wood processing methods.

BE IT RESOLVED THAT

Research is needed to define the required properties for different end uses.

WHEREAS in harvesting tropical forests much wood remains unused because of the great number and variety of species; and the unknown or unfavourable properties of many species.

BE IT RESOLVED THAT

Increase research on the properties and improved utilization of all tropical species whether single or mixed. Emphasis should also be given to developing means of transforming wood into products with low requirements of technology and capital investment and greater use of hand labour.

WHEREAS during harvesting, processing and utilization of wood a large amount of the biomass is wasted or not used to the best effect.

BE IT RESOLVED THAT

More research is needed aimed at the more rational and economic use of this material in order to achieve its fuller utilization.

WHEREAS with increasing energy costs and decreasing availability of non-renewable raw materials, the use of wood gains increasing importance.

BE IT RESOLVED THAT

Research should supply technological and economic information for the competitive use of wood and bark for various end-uses such as manufacture of building materials, paper and as a source of chemicals and of fuel.

WHEREAS manufacturing processes and working conditions at some wood-working plants may cause environmental pollution and hazards to health.

BE IT RESOLVED THAT

Environmental, safety and ergonomic criteria be used as well as economic and technical criteria in research programmes.

COMMUNICATIONS

WHEREAS with the ever growing volume and complexity of published information, access by research workers is becoming increasingly difficult.

BE IT RESOLVED THAT

It has become vital that progress be made in establishing a uniform and readily accessible international system for storage and retrieval of research information.

RESEARCH ORGANIZATION

WHEREAS the institutional and organisational framework within which forest research is conducted has a major influence on the relevance and effectiveness of research programmes.

BE IT RESOLVED THAT

a) This merits further study and in particular the processes of programme formulation and application of research findings;

b) That forest research organisations should liaise more closely with the organisations responsible for forest and land management, and that research programmes be developed, in particular, to assist managers in enhancing the contribution forests can make to human welfare.

WHEREAS the organisations of this large and complex international Congress has required the support of many people in Norway as the host country.

BE IT RESOLVED THAT

The Congress here assembled on June 26, 1976 recognised this support with gratitude and directs the President of IUFRO to convey our warm thanks to His Royal Highness Crown Prince Harald, the Prime Minister of Norway, the Norwegian Government, The Norwegian Ministry of Agriculture, the Forest Service, the Agricultural University of Norway, the Forest Research Institute of Norway, the University of Oslo and to the individuals who helped make this Congress a success (IUFRO 1976, p.88-93).

Excursions

To show Norwegian forests and experiment sites, 18 study tours were offered on June 28 - July 2, 1976. The cost of one tour (with accommodation in a single room) varied from NOK 1,400 to NOK 2,600, depending on the chosen tour (IUFRO News 1975b). The participants from the USSR delegation took part in 4 study tours (IUFRO 1976a).

Route 1.1. Forest fertilization; treatment and growth of young stands. It was attended by 45 delegates from 14 countries and 5 continents. The main demonstration sites were areas, fertilized with nitrogen, phosphor and potassium, in middle-aged stands near Sokna, Veldre and Overhalla. Due to climatic conditions in the north, the mineralization of organic material was very slow. The experiments had showed that nitrogen was the minimum factor for the growth of coniferous forests. In older spruce and pine stands, no effect of fertilizers was observed: e.g., in pine stands in Sokna, the increment (the absolute) had decreased during the last increment period. Though that might be due to the lowering of the ground water level by 0.75 m.

The excursion enabled its participants to learn about fertilization in young stands; thinning

of different intensity and frequency in pine and spruce stands; application of herbicides, etc. They also visited a factory for prefabricated houses, had a chance to admire beautiful Norwegian scenery, and were interviewed by the Norwegian Broadcast Corporation.

Route 1.2. Stand establishment and amelioration was attended by 29 delegates from 12 countries. The tour was focused on seed production and supply, planting stock production, planting practice, peatland afforestation, natural regeneration, reforestation in alpine regions, pre-commercial thinning, acid precipitation effect on forests and fish and forest vegetation. In addition the group visited the Norwegian Museum of Forestry, the Maihaugen Museum with old Norwegian wooden buildings, and the Hadeland glass factory.

Route 1.4. Afforestation in West Norway assembled 31 delegates from 14 countries. Its main destinations were a regional tree nursery, producing potted plants in glasshouses; a sawmill with its wood-processing capacity amounting to about 6,000-7,000 m^3 per year; permanent sample plots, established in the 1930s; and stands of Sitka spruce, Western hemlock, *Thuja plicata*, Douglas fir, *Abies alba*, *Abies grandis*, ash and oak. The superiority of Sitka spruce of Alaska origin and *Thuja plicata* was clearly demonstrated. On an adjacent replanted site (P 71), IUFRO's international Douglas fir provenance experiment was demonstrated. It consisted of 30 blocks, each with 51 provenances from Oregon, Washington and British Columbia. Preliminary indications were that growth and survival in Norway were the best with provenances from British Columbia, Canada and the Cascade Range in Washington.

On Wednesday, June 29, 1976, the party went to an experimental area, consisting of plots, planted in different site conditions in 1934-1939, using both pure and hybrid planting stock of spruce, fir and larch. On Thursday, June 30, 1976, the party visited experiment plots with thinning, and combinations of thinning with drainage, fertilization, etc. and also a local oil refinery. On the last day, they visited the Forest Research Institute, saw two most impressive plots of over 100 years old Norway spruce: the tallest tree had a top-height of 35.5 m, total growth stock of 1,863 m^3, current annual increment of 29.2 m^3 and mean annual increment of 17.6 $м^3$.

Route 2.1. Forest Genetics assembled 52 participants from 25 countries of Asia, Africa, America and Europe. It highlighted key problems of forest genetics and tree improvement, including grafting and handling of grafts; cutting trials with 260 clones of Norway spruce; vegetative propagation of Norway spruce; progeny trials and crossing systems; forest seed orchards; virgin forests; provenance trials with Norway spruce; controlled mass-pollination in Scots pine; control cone and seed insects; clone banks, tree nurseries, as well as the famous Heddal wooden church[220].

Route 2.2. Forest Entomology was attended by 35 participants from different countries. "The main of the visited sites were areas in natural and man-made stands as well as grafting-based seed orchards where pest control treatments (including treatments with DDT) were targeting different groups of both phytophages and xylophages" (Уткин, Кайрюкштис, Протопопов 1977, p.99). In addition to the description of the tour, provided in the program, there was a stop on the last of the excursion, on July 1, 1976, to visit and discuss the active outbreak of *Tortrix viridana*.

During the visit to the forest seed orchard, the tour participants agreed that many problems were similar in all parts of the world. A key problem was pollination of select trees from surrounding stands and infestations from unmanaged areas. It was noted that in the selection of trees for seed orchards, practically no consideration was given to tree resistance to insect pests and diseases. Several insect pests infested the cones and might significantly reduce the yield of extremely expensive seeds. Some species could be controlled through removing and burning the infested cones while other species had to supressed by selective insecticides. As of the time of the tour, many tests with different compounds were in progress.

[220] The Heddal stave church or Heddal stavkirke was the biggest of the preserved stave churches.

During the tour, the group was familiarized with problems, caused by outbreaks of *Ips typographus, Hylobius abietis, Blastophagus spp.,* and respective responses as well as with the problem of the so-called acid rains and their impact on pest outbreaks. In addition, the participants discussed insect population dynamics and measures of control; positive and negative aspects of logging by cable-way; removing versus leaving logging residues on cutting areas; soil fertilization.

Academician A.S. Isaev participation in that tour was mentioned in the Congress Report: "The tour was acclaimed to be an excellent blend of forest entomology, forest practices and Norwegian culture by the participants. The field discussions were extended to the evenings. Such informal meetings were hosted by our USSR delegate, Dr. Isaev, the Japanese delegation, Drs. Kobaishi and Yamane, Mr. and Mrs. Bevan, United Kingdom, and the American group" (IUFRO 1976a, p.446).

Route 2.3. Forest Pathology assembled 29 participants from different countries and started with its visit to the Norwegian Forestry Museum where the participants were introduced to the historical development of forestry, hunting and fresh-water fishing in Norway as well as the most dangerous forest diseases in the country.

In several localities, the group were acquainted with needle diseases, snow mould (mold fungus) and diebacks. In eastern Norway, they visited young stands of Scots pine with expressed girdling (scleroderris canker) and dieback, caused by *Gremmeniella abietina*; they also saw differences between this fungus and *Cenangium ferruginosum*. The discussed the problem, caused by *Phacidium infestans* in pine needles after the previous winter as well as earlier damages. The tour demonstrated the development of pine blister rust (*Endocronartium pini*) on twigs of bid trees.

In addition, the group saw pine seedlings, infested with *Lophodermium pinastri*, larch canker and dieback, caused by adverse climatic factors and development of *Lachnellula willkommii*, as well as Douglas fire needles, affected by *Rhabdocline pseudotsugae* and *Phaeocryptopus gaeumannii*. The most important forest disease for Norway was root rot, caused by *Heterobasidion annosum*, with its damages being especially expressed in spruce and Scots pine stands on the western coast.

During the excursion, its participants also discussed damage to forests, caused by abiotic agencies, including unfavourable climatic conditions and industrial pollution of the atmosphere which affected, first of all, coniferous stands.

Route 3.1. Forest Operations and Long-Distance Transport in Mountain Regions; Industrial Utilization assembled 35 participants. After the visits to the Forestry Museum and Norwegian Forest Research Institute, the party went to a low landing to get acquainted with its operation arrangements, and in particular, with radio-controlled cable-crane yarding of stems from clear-cuts.

On the first day, June 29, 1976, the visitors saw float ways and problems, occurring because of the construction of a power plant there: the network of float-ways was affected and the developer was to provide full compensations to the forest owner for the adversities due to the construction. In the demonstrated case, the developer constructed a network of forest roads to compensate.

On the next two days, the group visited areas of high-yield forests, areas of reforestation, based on up-to-date methods (seedlings with containerized roots); thinning in young stands with harvesting of small-sized trees to produce green biomass; cable skidding; a number of plants, engaged in sawmilling and further wood-processing.

Route 3.2. Harvesting, Transport and Ergonomics brought together 31 participants from many countries. On the first day, this group visited the Norwegian Museum of Forestry, Hunting and Fishery together with the participants of Excursion 1.2, they also visited the old fortress and wooden church, as an example of wooden architecture.

As for harvesting, the most relevant demonstration was that of various sophisticated equipment, including a double drum winch, mounted on a farm tractor; various skidders, including the most modern LKT-80 skidder; two systems of harvesting machines, etc. One showed the Logma delimber, limbing and topping whole trees, taken by a BM grapple-skidder to the road. The other

machine was the Valmet delimber/crosscutter, producing sawlogs and pulpwood which were taken by a Valmet forwarder to the landing. The demonstrated systems required a very high production per annum; therefore, it was decided against their wide use in Norway.

As for transportation, the excursion demonstrated equipment for transporting tree-lengths. The system of hydraulic retraction into an empty vehicle was found the most valuable. The participants also saw a specially designed truck to transport whole trees from young spruce stands. Then, the participants saw equipment for processing wood of small dimensions - chipper sawmills, as well as visited a plant of the A/S Borregaard where they could see how two men carried out a simple sorting and bucking of full-length trees into random lengths – sawlogs and pulpwood. The pulpwood went to a nearby landing for floating, and the sawlogs were utilized at an adjacent sawmill.

Floating in the Glomma River still seemed cost efficient for the transportation to distances above 150 km, though a vigorous debate was going on whether the floating should be continued in future. The group visited a landing for floating. Spruce pulpwood was peeled and stacked for drying and then placed in the river between May and September. The groups could see bundling of the timber: the logs assembled into a 10 m long tunnel before bundling. The method had been mainly the same since the beginning of the century; the group was impressed with its simplicity and effectiveness.

To demonstrate achievement in ergonomic, the excursion demonstrated two aspects: health and rehabilitation of forest workers (a visit to the Hernes Institute which was a rehabilitation centre for disabled workers in agriculture and forestry) and ergonomics of forestry equipment (demonstration of harvesting machines and equipment). One special topic was separately covered – it was the operation and safety of tractor-mounted winches as well as their controls and safety devices.

Route 4.1. Land Classification and Mapping was attended by the following delegates from the USSR: S.E. Vomperskiy, L.E. Mikhailov, and Yu.D. Khilov. The excursion showed examples of applied research and practical application of classification of natural resourced and land, including geology, terrain, soil, forests and other vegetation. A transportable exhibition was arranged to show examples of the use of remote sensing in Norway, chiefly in forestry. The demonstrated studies included “development planning at different levels, examples of producing geo-botanical, soil and cadastral maps of different scales, the work of the Norwegian National Forest Service and Association of Forest Owners, planning forest management activities in private forests, as well as forest exploitation technology, curriculum of a College to train specialists in environmental protection and environmental management planning. It was noteworthy that Norway was widely using large-scaled maps and aerial photographs in forestry and research work. At the national level, mapping had the scale 1:5000 and 1:10000 and was based on aerial photography for purposes of economic development planning. Such maps were very informative. They showed not only the physical and physiographic regions, but also borders of land holdings as well as data on soils, vegetation, forest species composition and yield, and forest management efforts (depicted with the help of different colours, hatching, symbols and legends)” (Уткин, Кайрюкштис, Протопопов 1977, p.99).

Route 4.2. Yield and Planning – Social and Economic Problems in Forestry covered the following issues: yield studies in spruce and pine and activities of the Norwegian Forest Research Institute in this field; methods, used for national forest inventory as well as for management planning in farm forests, larger private forests and state forests; management planning; methods and philosophy of planning for forests in different types of forest ownership; organization of management planning activities in farm forests; joint planning of farming and farm forestry; cooperation in forestry; activities of the Norwegian Federation of Forest Owners and its local branches; Norwegian forest policy: forest laws and other aspects of public forest policy; economic

impact of forestry on the rural economy with presentation of a research project, land use planning; multiple use of forest land: problems and solutions with respect to community land; forest industry.

Route 5.2. Sawmilling and integrated industries brought together 34 participants from 14 countries to travel across eastern Norway. Numerous questions, raised by the participants during the tour and after it, showed keen interest of the guests to what they saw. Their interest was not confined to the theme of the tour: participants enjoyed the demonstration of forestry operations. A trip through a part of 900 ha of forest area, burned only the day before, was a sinister, but fascinating experience.

Route 5.3. Wood quality and industrial utilization. Its participants visited demonstration sites and discussed how to foster the development of high-quality wood through such silvicultural activities as: pruning, genetic improvement through using high-quality seeds from seed orchards, application of fertilizers, adjustment of spacing in thinning operations, etc. There was a discussion about wood quality assessment, roles of the water and atmospheric regimes, especially in the context of environment pollution. The delegates visited a number of forest logging, pulp and paper, wood-processing and furniture companies in Sokna. This excursion was attended by I.K. Ievin from the USSR (ibid, p.99).

Route 6.1. Forestry and Recreation had 43 participants from 13 countries who were going to travel by bus during 5 days, starting from Oslo and ending in Trondheim to return by night train (total distance: 1,000 km). The excursion included a discussion of multiple use planning and forest recreation research, in particular, in the Oslomarka forest areas (170,000 ha) in the immediate vicinity of the capital city of Norway. These areas are very important for recreation, water supply, fishing sports and educational activities. Other discussions covered landscape planning and wildlife, competing resource uses and administrative novelties, hunting and fishing, set-aside conservation areas and land use issues.

Route 7.1. Forestry in West Norway had more than 30 participants, including Soviet scientists N.A. Moiseev and V.G. Atrokhin. The excursion included a visit to a basic nursery, covering 16,000 ha, and producing over 3 million pieces of planting stock (mostly, 2+2 young plants of Norway spruce and Sitka spruce as well as 2-years-old seedlings in greenhouses). Much attention was paid to experimental forest plantations (planted in 1930 and in 1934-1939) of exotic and native species, provenance study plantations of Douglas fir, established under a IUFRO program, young stands of 8 conifer species, planted in 1967 upon drainage of the area with a dense network of ditches, and other sites (fertilization experiments, thinning in forest plantations, etc.).

In most cases, it was noted that Sitka spruce stands were very promising for commercial cultivation. The excursion demonstrated Sitka spruce plantations, aged 70-100 years: their total growing stock was estimated at 700 m^3/ha and characterized with stable growth as well as areas in stands of Norway spruce: their yield was 1,860 m^3/ha, the current annual increment was 29.2 m^3/ha and mean annual increment was 17.6 m^3/ha. It was most interesting and beneficial to get acquainted with Norwegian forestry, forest research management and unique nature of the country (Уткин, Кайрюкштис, Протопопов 1977, p.99).

Route 7.2. Forestry in North Norway had 43 participants from 14 countries; they were provided with most interesting information not only about forestry, but also about the lifestyle in the area so far north: the tour reach latitude 69°N[221]. Nevertheless, the participants were very much impressed with the diversity of land uses, including agriculture, and vigorous forest growth on fertile soils. It was a good illustration of the Gulf Stream's favourable influence on the local climate. The natural tree dominants over the visited forests were pine (*Pinus sylvestris*) and birch (*Betula pendula*) with some aspen (*Populus tremula*) and a variety of willows (*Salix* spp.). In recent years,

[221] The northern polar circle is entrapped within the five central parallels, depicted on the Earth map and is located a bit to north of 66°N.

extensive trials of Norway spruce (*Picea abies*) had been made, and also more limited trials of Sitka spruce (*Picea sitchensis*) and blue spruce (*P. pungens*), as well as Siberian larch (*Larix sibirica*) and poplar (*Populus trichocarpa*). The tour illustrated forest management and silviculture, based on the native and introduced species, supplied from the nursery; the manufacture of particle boards and other aspects of Norway's forest sector. During the excursion, its participants kept sharing experience and ideas and established useful contacts for future cooperation.

Soviet/ Russian participation

The USSR delegation consisted of representatives from the State Forestry Committee (N.A. Moiseev, Head of the Delegation, V.G. Atrokhin, I.K. Ievin, L.N. Mikhailov and Yu.D. Khilov) and the USSR Academy of Sciences (S.E. Vomperskiy, A.B. Gukasyan, A.S. Isaev, L.A. Kairyukshtis, V.V. Protopopov, N.I. Pyavchenko and A.I. Utkin).

In addition to the members of the USSR Delegation, referred to above, the Congress documents mentioned other scientists from the USSR who had submitted their papers. For example, S.E. Vomperskiy and S.A. Solovyov from the Laboratory of Silviculture, USSR Academy of Sciences (Uspenskoye Village)[222] presented their paper at a meeting of Division 1 (the paper was titled: Den Holzarten unzuganglicher Feuchtigkeitsvorrat in Torfboden); and A.I. Utkin from the same Laboratory presented his paper titled: Biological Productivity in Scotch Pine Plantations in the Volga Basin (IUFRO 1976a, p.311).

Members of the USSR delegation presented 9 papers at the Congress (N.A. Moiseev, V.G. Atrokhin, S.E. Vomperskiy, A.B. Gukasyan, I.K. Ievin, A.S. Isaev, L.A. Kairyukshtis, L.N. Mikhailov, and A.I. Utkin).

Division 2 had the following contributions from Soviet scientists: A.S. Isaev and R.G. Khlebopros from the Institute of Forest and Wood, Siberian Branch of the USSR Academy of Sciences (Krasnoyarsk): Inertial and inertialess mechanisms for quantity regulation of forest insects, N.V. Starova (Ufa) and S.P. Kots from the Ukrainian Research Institute of Forestry and Amelioration (Kharkov): Using of the distant hybridization and polyploidy in the selection of wood species; A.B. Gukasyan from the Institute of Forest and Wood, Siberian Branch of the USSR Academy of Sciences (Krasnoyarsk); N.A. Konovalov and N.P. Pichugina from the Ural Forest Engineering Institute (Sverdlovsk): Cytological peculiarities of interspecific birch hybrids; I.A. Shavliashvili, A.L. Mukhashavria and D.G. Zharkov from the Georgian Institute of Plant Protection (Tbilisi): *Dendroctionus micans* Kug. Population and integrated control in Georgia.

At the session of Division 3, the following papers were presented: I.K. Ievin with co-authors from the Latvian Research Institute of Forestry Problems, *Silava* Research and Operation Association (Riga): Peculiarities of harvesting technology in felling areas with a great number of small-sized trees (IUFRO 1976a, p.321); A.P. Livanov from the Central Research and Designing Institute of Mechanization and Energy Systems of Forest Industries (Khimki, Moscow Oblast): Peculiarities of forest road planning in mountainous conditions (ibid., p.321); V.V. Antanaitis and R.S. Zhadeikis from the Lithuanian Agricultural Academy under the Academy of Sciences of the Lithuanian SSR (Kaunas): Die Klassifikation des Holzzuwachses in der Sowjetunion und die Richtungen in der Vervollkommnung der Aufnahmeverfahren (ibid., p. 323).

At the plenary session of Division 4, the paper of G.I. Vorobyov, Chairman of the USSR State Forestry Committee, was read (it was titled: Silviculture under the Planned Economy). At other sessions of this Division, their papers were presented by N.A. Moiseev from the USSR State Forestry Committee (Moscow): The principles of management of forest resources in the USSR; L.A.

[222] Now: the Institute of Forest under the Russian Academy of Sciences.

Kairyukshtis from the Lithuanian Forestry Research Institute (Kaunas) and V.G. Atrokhin from the USSR Institute of Continuous Education in Forestry (Pushkino, Moscow Oblast).

Nikolay A. Moiseev, Board Member, Director, Department of Science, International Relations and Best Practice Introduction, USSR State Forestry Committee (1970-1977), represented the USSR in the IUFRO International Council and was elected Member of the IUFRO Executive Board.

Interesting facts

In the early 1970s, IUFRO initiated its special program in support of young scientists.

It is common knowledge that it was very difficult for young scientists, especially, from developing countries, to participate in international events. Limited resources, earmarked for such congresses, symposia and workshops, tended to be made available for invited speakers, prominent scientists, i.e., those aged over 40 years. Professor Ivar Samset, IUFRO President, proposed to provide opportunities at least for some of young research workers under 40 years from developing countries to participate in the 16th IUFRO World Congress. Per request from Ivar Samset, the Norwegian Agency of Foreign Development (NORAD) had agreed to give IUFRO half a million Norwegian Krona for the IUFRO Scholarship Fund. Unfortunately, other international development agencies refused to provide such financial support.

Nevertheless, the provided resources were used to fund competitive selection of the best authors and their participation in the Congress. The 50 selected proposals (out of 121 submissions) were from young scientists who represented the following countries: Tanzania (7), Kenia (5), Malaysia (3), Thailand (3), Philippines (3), Brazil (3), Ghana (2), Portugal (2), Turkey (2), Columbia (2), Nigeria (2), Egypt (1), Surinam (1), Zambia (1), Malawi (1), Shri-Lanka (1), Morocco (1), Cote d'Ivoire (1), Sudan (1), Cameroon (1), India (1), Peru (1), Honduras (1), Upper Volta (1), Mexico (1), Indonesia (1) and Pakistan (1). So, owing to the support from the IUFRO/NORAD Program, 50 young scientists from 27 developing countries arrived in Oslo to participate in the Congress (IUFRO 1976a, pp.303-304).

The Congress Proceedings were published in six volumes (by Division) on a total of 2,728 pages, and together with the Congress Report volume, the number of pages reached 3,221. The three official languages of IUFRO were used unevenly in all the volumes as most papers were published in English.

It is worthwhile to mention that our compatriot participated in the preparation of the Congress: it was Vladimir K. Voronitsin who was a PhD student of Professor Ivar Samset[223].

[223] Now: Professor, Head of the Chair of Automated Production Management in Forestry and Forest Industries, Moscow State Forest University.

Chapter 22
Congress XVII – September 7-12, 1981, Kyoto, Japan

This Chapter draws from the Proceedings of the 17th IUFRO World Congress, published by the Congress Organizing Committee in Ibaraki (IUFRO 1981a, b), as well as from articles of participants of the Congress (Burkhart, Berntsen 1982). The Proceedings of the 17th IUFRO World Congress were published in 8 volumes: (a) Congress Report, and (b) 7 volumes of papers, including six volumes of Divisional Proceedings, and one interdisciplinary volume.

Overview

The 17th IUFRO World Congress was the first IUFRO Congress held in Asia. Its title/theme was: *Research Today for Tomorrow's Forests,* symbolizing the long process of forest growing and outlook into the future with new generations, benefiting from the outputs of those efforts. On the other hand, the rapidly growing demand for forest products, especially wood products, and quickly broadening range of forest products and benefits, increasingly viewed as consumer goods, urged to address such needs as forestry intensification, higher forest yield, multiple-use forest management, and mechanization of labour-consuming forest operations, but all these were impossible without most proactive, transformational influence of forest science on practical forestry (Мелехов и Моисеев 1982, p.130).

In 1981, IUFRO united about 8,000 scientists from 394 member organizations in 93 countries under its 6 Divisions, consisting of 171 working parties, distributed among the 40 subject groups and 16 project groups (IUFRO 1981a, p.114).

The Congress brought together 1,300 delegates (or 1,540 people, including accompanying persons) from 71 countries[224] and the FAO. The largest delegation was that of host country – Japan (571 people). The Congress was attended by 118 participants from the USA, 44 from Sweden, 43 from China (mostly from Taiwan), 40 from West Germany, 37 from Canada, 33 from Norway, 32 South Korea, 26 from each of Australia and Finland, and the other delegations consisted of fewer than 20 people. The Congress was attended by 6 delegates from the USSR. It is noteworthy that the FAO was represented in delegations of several countries, including the countries where its regional offices were based: Italy, Thailand (5 delegates in each of the delegations), and Brazil (1 person).

The agenda included 5 plenary sessions, 150 other meetings with presentation of over 800 papers (330 invited papers, 257 voluntary papers, and 248 posters), and 14 study tours during September 13-17, 1981.

Scientific program

On September 7, 1981, the Opening Ceremony of the Congress started at 10:00 a.m. in the main hall of the International Conference Centre with sounds of the traditional *gagaku* music[225] and the entrance of Imperial Highnesses the Crown Prince Akihito and Princess Michiko.

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[224] 73 countries (IUFRO News, 1981, No.33 (3/181), p.1).
[225] Translated as 'exquisite music' (雅楽).

In his welcome address, President W. Liese from West Germany underlined the importance of research cooperation for meeting the growing needs for forests and their products all over the world. He also pointed to the contribution of forest research to the development of countries in Asia, Africa and South America, facing major forestry problems. To help them improve their situation, about 100 young scientists from 28 developing countries were provided with the opportunity to take part in the Congress owing to the support of many organizations, including the Japanese International Cooperation Agency (JICA), World Bank, FAO, UNESCO, UNEP, and the following international development agencies: GTZ (West Germany), IDRC (Canada), NORAD (Norway) and SAREC (Sweden). He reminded that Japan had started to cooperate with IUFRO in 1903, and was hosting the first IUFRO Congress in the Asian Continent. He declared the Congress opened.

After that, the following representatives from the Japanese authorities and forest officials welcomed and congratulated the Congress:

- Dr. Matsui, Chairman of the Japanese Congress Council;
- Imperial Highnesses Akihito, Crown Prince who also emphasized the role of forests in the development of cultural environment in Japan and interdependence between humans and the natural environment, making it necessary not only withdraw resources from forests, but also to take care of their conservation;
- Mr. Kameoka, Minister of Agriculture, Forestry and Fishery;
- Mr. Shibata, President of Congress Cooperative Association;
- Mr. Akiyama, Director General of the Japanese Forestry Agency who told the audience about the forestry of Japan.

[Opening Ceremony, September 7, 1981, Tokyo, Japan. Source: Burkhart and Bernstain, 1982.]

In particular, Mr. Akiyama noted that Japan harboured over 700 tree species, but only two of them (Japanese cedar and Japanese cypress) were primarily used for reforestation. He said that in the late 19th century, the isolation of the nation from the other world had ended, and Japan had instituted its higher schools of forestry, forest administrations, forest experiment stations and institutes. Over 31% of the forests were under governmental management, 10% were managed by communities, and the remaining 59% were privately owned. Man-made forests accounted for about 40% in the total forest area in Japan.

In his keynote address, IUFRO Past President, I. Samset from Norway elaborated the theme of the Congress: *Research Today for Tomorrow's Forests*. He noted that foresters were often arguing which of the silvicultural systems were the most profitable – selection, uneven-aged or mixed forests, etc. whereas Japanese cedar forests revealed other opportunities. For example, there were such forest plant species as tortoise-shell bamboo (*Phyllostachys pubescens*), which reached 20 cm in diameter at breast height during one year and had height increment of over 1 m per day at early stages of growth. He said: "The forester and the environmentalist agree in their enthusiasm for the beauty of the forest. Beauty never made the kettle boil! Unsound forest stands have low production and are easily damaged by forest fire and other hazards" (IUFRO 1981a, p.25).

Then, the speaker noted that the wheat harvest had tripled in Kenya within the recent 50 years (from 1920 to 1970). During the same period, Scandinavia had tripled its potato harvests per ha. In the USA, the total agricultural output doubled during 30 years between 1940 and 1970. Potential global wood harvest was estimated at 2.7 billion m^3 per year. The speaker explained that timber harvests could not be doubled because forest resources were really renewable only when they were properly managed through a good forestry and management practice. At the same time, political obstacles hindered the transfer of research findings into good forestry practices (ibid., p.25).

In other words, harvests of forest products and forest cuts could be doubled, but, research had not yet become a driving force for addressing many problems, facing foresters. He also said: "Research today for tomorrow's forests: This does not first and foremost mean that we start research today in order to attain results sometime in the distance future. Worldwide forestry research has already collected a vast fortune of useful information. Immediate, practical application of these research findings will certainly improve tomorrow's forestry. It is obvious that the existing research findings should be made available for practical forestry" (IUFRO 1981a, p.28).

The final event of the Opening Ceremony was to present the IUFRO Scientific Achievement Award for which 7 awardees had been selected among 41 nominations. Dr. Robert Buckman presented the Award to the following 7 scientists: Suezone Chow (Canada), Hugh Graham Miller (UK), David Jan Bevege (Australia), Harold E. Burkhart (USA), Makoto Ogawa (Japan), Pekka Juri Kilkki (Finland), and Kent T. Kirk (USA).

The Distinguished Service Award (DSA) was introduced in 1978 and presented for the first time at this Congress: its first recipient was Mitsuma Matsui from Japan.

The Award symbolised the 5 continents: it consisted of four cubes and a mount, made of wood of 5 tree species from the 5 continents.

Earlier, in 1980, another IUFRO award was introduced: it was the Certificate of Appreciation to reward IUFRO office holders at the point of leaving their offices in IUFRO. This Certificate was also meant to express appreciation for notable contributions to IUFRO's development, assistance in holding high-level IUFRO meetings or addressing importance tasks for the Union.

Each day began with a plenary session with a key address on the theme of the Congress to be followed with divisional meetings. The first key address, titled *Keep the Globe Green* was made on September 8, 1981, by Mr. Takeshi Watanabe, first Japanese Chairman of the Trilateral

Commission[226], first President of the Asian Development Bank. Mr. Watanabe noted that developing countries were still heavily dependent on traditional energy sources such as firewood, charcoal and animal wastes. He said that according to the latest study of the Asian Development Bank, 35% of the energy consumption was in such forms in the developing countries of Asia, and this share was as high as 56% in Bangladesh, 73% in Afghanistan and 96% in Nepal. He said: "According to a World Bank estimate, the loss of woodland is expected to be 10 to 15 million hectares a year on a global basis. In 'The Global 2000 Report' made to the President of the United States, the following statement is found: 'By 2020, virtually all the physically accessible forest in the LDCs is expected to have been cut'. This crisis of disappearing forests is less widely acknowledged than the well-known oil crisis, but it is not less imminent, nor less serious" (IUFRO 1981a, p.83-84).

To address this challenge, the speaker proposed to initiate a worldwide campaign for reforestation in the arid zone and suggested approaching the United Nations to declare a '*Reforestation Year'* with an emphasis on the importance of approaching the problem on an interdisciplinary cooperation basis to meet the needs for both food and wood.

On September 9, 1981, Mr. R.M. Peterson, Chief, USDA Forest Service, delivered his key address, entitled; *Tomorrow Forests: Will We Be Ready*? According to Mr. Peterson, some projections indicated that world population could grow from 4 billion in 1975 to more than 6 billion in the year 2000, 10 billion by 2030 and 30 billion by the end of the 21st century. He said that it would increase the pressure on ecosystems, especially on soil, forest and water and articulated the following questions: What sort of research program will be needed? How to improve forest productivity? How to understand what should be investigated tomorrow and what we may know today? Answering these and other questions, the speaker urged scientists "to promptly deliver research findings to those who could apply them". He also suggested that national efforts should be strengthened and complemented with an even greater degree of international scientific cooperation, saying: "Perhaps the best approach would be through one or more international institutes patterned after the International Center for Maize and Wheat Improvement, located in Mexico. Such an undertaking could bring together a 'critical mass' of scientists to address some of the mutual problems which occupy our attentions" (IUFRO 1981a, p.92).

The third key address (*Forest Research and Development for Self-Reliance*) was delivered by M.A. Flores Rodas, Assistant Director General and Head of the Forestry Department, FAO, on Septemebr 10, 1981. He informed the audience about the years of cooperation between the FAO and IUFRO in the changing world. In particular, he said: "The changes to which I allude are the changes that are taking place in perceptions the potential role that forestry can play in the process of stimulating development and self-reliance in the less developed parts of the world. These new perceptions stem largely from a broader understanding that development as a whole can only take place in a sustained fashion if it is based upon rural development - the alleviation of rural poverty so that the energies of the rural masses can be mobilized behind the process of change" (IUFRO 1981a, p.94-95). At the same time, he noted that it had created a problem of deforestation for development: "The recently completed FAO/UNEP study on Tropical Forest Resources Assessment shows that the area of closed forests under shifting cultivation is not very far from 250 million ha and that the annual rate of increase exceeds three million ha. Furthermore, the area of open forests is nearing 700 million ha, with an annual increase of 3.5 million ha. These figures speak for

[226] The Trilateral Commission is an international group of representatives of the USA, Western Europe and Japan, established in 1973 at the initiative of David Rockefeller, put forward at the meeting of the Bilderberg Club in 1972. The officially declared goal of the group is to discuss and look for solutions to address world problems.

themselves and point forcefully to the need for strengthening research efforts aimed at the establishment of viable and stable agro-silvopastoral systems" (Ibid., p.97).

On September 11, 1981, Professor J. Speer, IUFRO Honorary Member and former President, delivered the final key address, called *International Cooperation in Forestry Research*, drawing attention to such key issues as demand for forestry research as well as development, problems and prospects of international cooperation in forestry research.

The Congress included the following four inter-divisional meetings: (i) Impacts of Forestry on Forestry Itself (Divisions 1, 2, 3, 4), chaired by D. Mlinsek, Yugoslavia, with 3 papers discussed; (ii) Tropical Ecophysiology (Divisions 1, 2), chaired by M. Matsui, Japan, with 9 papers discussed; (iii) Stand Monitoring and Yield Forecasting (Divisions 4, 6), chaired by W.C. Warren, Canada, with 4 papers discussed; and (iv) Forest Inventories in Combination with Remote Sensing (Divisions 4, 6), chaired by P. Schmid-Haas, Switzerland, with 1 paper discussed[227].

Then, all Divisions had their plenary meetings with their introductory reports; and technical discussions were held in groups.

Division 1 *Forest Environment and Silviculture*. At the plenary session, chaired by Professor D. Mlinsek, M. Chiba delivered the paper about silviculture for the mankind of tomorrow. Subject Group 1 (Ecosystems) had 3 discussion papers and 1 poster. Subject Group 2 (Site) had 6 verbal presentations and 13 posters. The meeting of this groups including presentation of the paper: Vompersky S.E., Sokolov A.A., Glukhova T.V. (Laboratory of Silviculture, USSR Academy of Sciences (Uspenskoye Village) Effects of forest and man's economic activities in small watersheds on stream flow quality (IUFRO 1981c, p. 229-238). Group 3 (Environmental influences) had 12 papers, and Group 4 (Torrens, snow and avalanches) had 12 posters and 7 verbal presentations, including one paper from the USSR: Voronkov N.A. (VNIILM): Potentials for runoff increase from forest catchments (IUFRO 1981c, p.173-178). Group 5 (Stand establishment, treatment and amelioration) had verbal presentations and 14 posters; each of Group 7 (Tropical silviculture) and Group 8 (Wildlife habitat management) had 5 verbal presentations and 2 posters. The most prevalent forest biology themes were: nutrient cycle; productivity and nutrient uptake; role of nitrogen-fixing tree; role of gibberellins or plant growth regulators in promoting early fruition; conifer seed breeding. It emphasized the impact of up-to-date forestry on stand yield, including the impact of pollution on tree growth.

Division 2 *Forest Plants and Forest Protection*. The plenary session was chaired by R.Z. Callaham (USA). The genetics group discussed such issues as: identification of populations and clones; iso-enzyme analysis; quantitative genetics; gene preservation; species hybridization; breeding at the cell level, etc. In the field of forest pathology, the focus was on pine wood nematodes whereas entomologists, as during the previous Congresses, focused on bark beetles; insect pests, damaging seeds and cones; forest insect population dynamics, correlations between pests and site conditions. At the meeting of Group 2 (Provenance, breeding and genetics), the paper of G.I. Vorobyov (USSR State Forestry Committee): Breeding, genetics and seed growing as a basis for establishing high yield forest was presented (IUFRO 1981d, pp.135-146), and Group 4 (Entomology) heard the paper of L.E. Mikhailov (USSR State Forestry Committee), called: Potentialities for predicting aspen stand resistance to rot diseases (IUFRO 1981d, pp.551-558).

In addition, two discussion papers were submitted by representatives from the USSR to Group 5 for discussion without their presentations; they were: Phenolic compounds in male and female aspen trees *(Populus tremula L.)*, prepared by Ilmars Lapa from the Latvian State University,

[227] The proceedings of the interdivisional meetings were published in an additional volume of the Proceedings.

Riga, and Stadnitzky G.V. from the Leningrad Technical Institute of Pulp and Paper Industry on Cone and seed insects diapause and its significance in seed production (IUFRO 1981a, c.354, 355).

Division 3 *Forest Operations and Techniques*. Its plenary meeting, chaired by M. Bol (Netherlands), heard two papers: (i) H. Steinlin and U. Sundberg spoke about forestry activities for forests of the future, and (ii) R. Koch talked about the use of above-the-ground biomass of mixed coppice forests. At the meetings of Group 1 (Harvesting and transport) and Groups 2 (Forest operations under mountainous conditions), 15 papers were presented and 12 posters were displayed. The meeting Group 3 (Operational methods in the establishment and treatment of stands) included presentation of the paper: Mechanized methods of establishing forest stands on slopes in the USSR, prepared by V.V. Chernyshov and Yu.M. Serikov from VNIILM, USSR (IUFRO 1981e, pp.313-324). The meetings of Group 4 (Operational planning and control; work study), Group 5 (Ergonomics); Group 6 (Harvesting wood utilization); Groups 7 (Forest operations in the tropics) had a total of 14 papers/presentations and 6 posters.

Division 4 *Planning, Economics, Growth and Yield, Management and Policy*. At its plenary meeting, chaired by R. Plochman (Germany), four papers were heard: J.F.M. Arnold spoke about forestry for community development (goal setting); M. Nishizava inform the audience about the use of aerial photography and ground-based imagery for volume and increment estimation; F. Helles talked about methods to identify and assess problems with small private forests; P. Bartelheimer highlighted economic aspects of recreational functions of forests and environment.

The meeting of Group 1 (*Mensuration, growth and yield*) heard 2 papers, and 8 posters were displayed to demonstrate the latest achievements in modelling of competition in forest stands and increased basal area of stands; distribution of trees by diameter; volume increment in thinned tree stands; mathematical modelling; comparison of tree stand growth models with different degrees of precision; application and alignment of procedures for customizing models of regional profitability to local conditions; employment of growth models for forest management and forestry planning.

Group 2 (*Forest resource inventory*) discussed 7 verbal presentations and 8 posters. It focused on the latest achievements in sampling and bottlenecks in biomass research. Professor W.Bitterlich (1908-2008) demonstrated his tele-relascope, an improved relascope or optical dendrometer. Groups 3-5 discussed studies in the area of forest economics along the following four liners: microeconomics, systems analysis, macroeconomics and political economy of forestry. In microeconomics, they were addressing economics of thinning and other silvicultural treatments, forest recreation, agroforestry, energy generation from fuelwood, and accounts. The target audience of the systems analysis discussion was, primarily, forest specialists, using operations research for forest management. The macroeconomic discussion was focused on national income accounting, round wood demand and supply projections and contribution of the forest sector in national economic development at the country level, etc. Papers, relating to political economy, addressed issues, arising from taxation and incentives to improve performance in the forest.

In particular, 15 papers and 8 posters were submitted to Group 3 (*Economics at national and international level and forest policy*). Group 4 (*Forest management planning and managerial economics*) received 10 papers, including one paper from the USSR: N.A. Moiseev and S.G. Sinitsin (VNIILM) – Sustained yield as ethical obligation in forest management planning (IUFRO 1981f, p.409-420). Another contribution from the USSR for this Division was the poster of V.V Galitskiy (Institute of Agronomical Chemistry and Soil Science under the USSR Academy of Sciences, Pushchino): Production process in near uniform stands (IUFRO 1981f, p.557). Group 5 (Economics of Recreation, Forestry and Human Environment) reviewed 10 papers.

Division 5 *Forest Products.* At the plenary session, chaired by William E. Hillis (Australia), five papers were presented by the following authors: B. Madsen who spoke about North American

classification and analysis within classes; B. Thurnell who talked about conifer species classification in Northern Europe and the ECE zone; B.A. Bendtsen and R.L. Youngs who informed the Division about assessment of machining stresses in the wood; R.H. Leicester talked about construction timber classification; and R.L. Youngs assesses the needs and prospects for forest products. Group 1 (Wood quality; property and utilisation of tropical wood – the wood from tomorrow's forests) had 6 verbal presentations and 15 posters; Group 2 (Wood engineering – processes of tomorrow) had 10 papers and 7 posters; 3A (Production and utilization of bamboo) had 2 papers and 22 posters; 3B (Energy from forest biomass) has 2 papers and 3 posters; 4A (Wood protection) has 4 papers and 10 posters; 4B (Wood chemistry) had 8 papers and 11 posters; 4C had one poster. The paper of V.A. Soloviev from Leningrad Forest Technical Academy: Kinetics of decompression of wood by wood destroying fungi was registered in Group 4 as well (IUFRO 1981g, p.301-310).

Division 6 *General Subjects*. Its plenary session was chaired by J. Parde (France), and heard two papers: (i) G.H. Moeller and H. Heytze about challenges and opportunities for technology transfer in forestry and (ii) S. Schrader about new challenges and research methods for forestry information. The five established groups discussed the following number of papers/posters: 1. Forest landscape, recreation and tourism: 6/2; 2. Statoistical methods: 11/ 6; 3. Information systems and terminology: 6/4; 4. Forestry aspects in industrialized countries since the 17th century: 10/2; 5. Forest research management and application: 12/10.

At the IUFRO Congress, "researchers reemphasized the need for continued work in forest policy, calling for studies to compare legislative and administrative arrangements for forest planning and management as well as to examine the processes which affect formulation and implementation of those policies. A major development in policy during recent years is the increased emphasis on integrated, multiple-use planning. Throughout the world, planning now goes beyond traditional timber-production objectives to include a comprehensive examination of the whole range of forest functions and uses. The challenge of long-term planning has spurred development of analytical models and techniques to help managers estimate various resource values and evaluate trade-offs among planning alternatives. While these analytical models are useful for a variety of planning and management purposes, IUFRO researchers agreed that decision-makers as well as researchers need to be aware of both the technical and political institutional limits associated with the development and use of such models" (Burkhart, Berntsen 1982, p.168).

The closing ceremony stared at 10:00 a.m. on September 12, 1981. Professor Liese reported about IUFRO activities during the elapsed period, referring to statistics. Then, Vice-President Satoo summarized the discussions and decisions of IUFRO management meetings; his report was followed with the adoption of the general Declaration and its 6 paragraphs were presented by Professor Sundberg; and the new Executive Board, elected by the International Council, was introduced.

In conclusion, newly elected IUFRO President Dushan Mlinsek from Yugoslavia delivered his program address; and the floor was given to delegates of the Congress. The first speaker was Professor G.I. Vorobyov (USSR) and his speech is presented below:

Mr. President,

Dear Ladies and Gentlemen, Comrades:

On behalf of the Soviet delegation and all those, who work in forestry in the Soviet Union, I would like to give you, forest scientists and specialists of all the countries, represented at the international Congress, our hearty greetings and best wishes of success in your noble labour, aimed at improving peoples' life and environment at our planet.

The 17th IUFRO World Congress has raised urgent matters of better and more effective use of research to solve main problems, which each country, continent and world forestry, as a whole, are being confronted with.

The most important problem that we are all solving, taking into consideration particular conditions of each country, consists in raising forest yield to meet ever-growing demands of people for various forest products and benefits.

Our meetings at such world forums enable us to combine our experience and scientific achievements into a unified treasury of knowledge that is becoming accessible to all. I believe this is the major result of the IUFRO World Congress that is coming to its close.

I would not enumerate all the interesting and useful matters which have been discussed at the plenary and various working group sessions. It would take too much time. We shall still have to make use of the richest information, received here, and make it accessible to our colleagues at home.

Great benefit consists also in our meeting here, renewing and strengthening contacts and agreeing how to cooperate further. Wide international cooperation in science and technology, including exchange of information, seeds and planting stock, technologies and new ideas, contribute in the best possible way to establishing future high yield forests, that will meet various demands of mankind.

IUFRO is the oldest international forestry research organization that plays an important role in strengthening and developing this cooperation. We had the pleasure to receive colleagues from IUFRO in our country: last year the Executive Board held its meeting in Moscow and Sochi[228], in 1979 IUFRO International Symposium on Stand Establishment was hosted by two of our institutes - IUFRO members - All-Union Research Institute of Silviculture and Mechanization of Forestry (Pushkino, Moscow Region) and the Latvian Research Institute of Forestry Problems (Riga)[229].

In future, our country will extend the cooperation with IUFRO and support it in all important undertakings for the benefit of peoples of the world. We, foresters, represent one of the most peaceful professions on Earth and with our labour and cooperation we must strengthen peace in the world, develop friendship and mutual understanding between our nations.

Taking advantage of this opportunity to speak at this closing ceremony, I would like to thank IUFRO leaders for the invitation to take part in the Congress and also Japanese colleagues, hosts of the Congress, who welcomed us cordially and ensured excellent conditions for our work (IUFRO 1981a, p. 126-127).

After that, four more participants expressed their gratitude to the Congress organizers.

Organizational matters

The International Council convened two sessions on September 6 and 10, 1981, to obtain information on IUFRO's work, discuss international cooperation and elect the Executive Board for the next period.

The IUFRO Executive Board held two meetings on September 5 and 12, 1981, to discuss the current affairs of the Union and preparation for future work, and to appoint Deputy Coordinators of the Divisions and Heads of the Working Groups.

On September 12, 1981, at the Closing Ceremony of the Congress, the new IUFRO leaders were named: President (1982-1986) Dushan Mlinsek from Yugoslavia; Vice-President Robert Buckman from the USA; previous President Walter Liese from Germany, who now headed the Programme Committee.

Members of the Executive Board were elected: Professors Ulf Sundberg (Sweden); Zigmunt Patalas (Poland), Ricardo Morandini (Italy), Doctors Walter Bosshard (Switzerland), James Cayford (Canada), Paolo Galvao (Brazil), Sumihiko Asakava (Japan), Salleh Mohd. Nor (Malaysia), Nikolay

[228] See Chapter 33 for information about other events.
[229] The *Silava* Research and Operation Association.

A. Moiseev (USSR), Mssr. Ali Semizoglu (Turkey), Sene Elhadji (Senegal), and Otmar Bein (Austria), IUFRO Secretary, and Dr. Marco Antonio Flores Rodas (Italy), representative of the UN FAO as an observer.

In addition, the IUFRO EB included the coordinators of the six Divisions: D1 – Professor Richard Hermann (USA); D2 – Dr. Edwin Donaubauer (Austria); D3 – Professor Martin Bol (Netherlands); D4 – Professor Richard Plochmann (Germany); D5 – Dr. William E. Hillis (Australia); D6 – Professor Lars Strand (Norway).

In his address, new IUFRO President D. Mlinsek noted that the green revolution in forestry had failed as the forest area had shrunk. Therefore, forestry was called to break forward. He stressed that whatever was required was available: IUFRO and its members had knowledge and technology, could combine forest production with forest protection and conservation to ensure sustained flow of resources from the forest as the main renewable resource of the world. President Mlinsek reported about the international relations which IUFRO had with about 20 international organizations. In all these relations, the IUFRO would observe its status and potential as an international, non-political, independent scientific organization. The International Council was also informed about a small revision of the IUFRO Internal Regulations, decided by the Executive Board. A few amendments appeared necessary to take into account past experiences. It was intended to print the revised Internal Regulations in the 3 IUFRO languages and distribute to the members (IUFRO News 1981).

Resolutions

Declaration of the 17th IUFRO World Congress: Research Today for Tomorrow's Forests

CONSIDERATIONS

Wood is the world's major renewable commodity and world demand for wood and other forest products and services is increasing with population growth and improved living standards. There is a finite area of land in the world for the production of goods and services and the proportion able for forestry is steadily diminishing.

Unless appropriate measures are taken increased exploitation will in many regions endanger not only the future supply of goods and services from the forest but also the forest gene resources, agricultural production, water resources and the human environment.

The distribution of forests in relation to human populations is unbalanced and there is an imperfect understanding of the ecology of both natural and manmade forests especially in some tropical regions.

There is a considerable potential for increasing the productivity of forests and for integrating the various demands upon the land.

Forest research is necessary to develop the forest potential, to overcome the constraints and difficulties and to alleviate the hunger, poverty and unemployment that are suffered by man in many regions.

DECLARATION

The priorities of research are to gain a fuller understanding of the ecology of the world's forests, to increase their productivity both in quantity and quality and to improve conversion and utilization of forest products. This is particularly urgent in tropical regions.

Inter-agency research into integrated land use should be encouraged, especially in tropical regions.

Forestry research should take account of the social, cultural, operational and economic factors in different regions.

There is a special need for research into the production of fuelwood in deforested regions and into the use of forest biomass for energy throughout the world.

There should always be close cooperation among policy makers, forest managers and research workers, both nationally and internationally, to ensure the formulation of realistic and productive research programmes and the effective implementation of research results.

In the fact of financial stringency, governments and other supporting organizations should provide reasonable funding for forest research to enable forest research workers to make an effective contribution to human progress" (IUFRO 1981a, pp.181-183).

"Division 1: Forest Environment and Silviculture

CONSIDERATIONS

In order to increase production per unit area, methods are being applied and further developed, which concentrate too closely on the maximization of increment and yield and thereby threaten the stability of forest ecosystems ecologically and economically.

There is a tendency for silvicultural research and practice in natural and semi-natural forests to be too closely oriented to agricultural techniques.

The results of research aimed at understanding or improving the various functions of forest simultaneously, are not always sufficiently applied in practice.

Notwithstanding considerable activity in the field of agroforestry research and practice, particularly in the third-world countries, this kind of land use must be better understood so that agroforestry practices can be introduced more rapidly to suitable regions of the world.

The extent of deforestation is becoming very serious, whereas the rate of afforestation is inadequate.

Insufficient consideration is given to research into trees and small plantations in urban areas and outside the forest.

RECOMMENDATIONS

The methods and techniques of creating, maintaining and improving forest ecosystems, as developed in temperate and boreal zones, need to be further improved and tested before being applied to other forest ecosystems, in particular in tropical and subtropical climates.

Silvicultural practice and research must be related to the natural processes in the forest.

There is a need to improve the dissemination of results of silvicultural research by extension services, and by training and education.

Research on agroforestry should be intensified. However, this can only be done successfully if

- there is close cooperation with other land-use specialists such as agriculturists and horticulturists, and
- relevant basic research is included in cooperation with other relevant international institutions.

There is a need for further research into the suitability of land for afforestation. This includes classification of the site, as well as research into the requirements of trees. Moreover, afforestation techniques need to be further developed. Arboriculture and related research need to be further developed" (IUFRO 1981a, pp.188-189).

"Division 2: Forest Plants and Forest Protection

CONSIDERATIONS

Rapidly expanding forestry operations in tropical and subtropical areas commonly deploy species on a very large scale, decreasing the extent of indigenous and undisturbed forest ecosystems and leading to loss of genetic resources as forest populations are removed.

Such forestry is often likely to be adversely affected by poorly known pests and diseases, although resistance of plants and plant communities to biotic damaging agents is the rule, not the exception.

Integrated pest management is the most effective way of combatting damaging agents but integrated approaches to forest protection are at the present, rarely adapted.

Traditional research on existing resources and commercial plantations will continue to be needed but more emphasis is required on the contribution of trees and forest to rural development.

With limited financial means, funding of basic research in forestry is being reduced particularly in the fields of physiology and genetics. The temptation to abandon research that is not immediately applicable should be resisted in the long-term interest of forestry.

RECOMMENDATIONS

There should be an increase in the support for gene conservation activities and the need for such measures must be considered and appropriate action taken at all levels wherever forests are used.

Sufficient ecosystems of special interest, particularly in the tropics, should be preserved so that all interacting organisms can continue to co-evolve and remain available for study.

Study of the genetics of interactions between trees and agents in the field of entomology and pathology are urgent and should be encouraged.

Genetic resistance should be incorporated into integrated pest management systems whenever favourable results may be expected.

Agencies should be alerted to the danger that well-intended actions to ensure excellence of cultivars may narrow the genetic base and reduce variability vital for the stability and resilience of the forest.

Research-supporting agencies should keep an adequate balance between funding for basic and applied research" (IUFRO 1981a, pp.190-191).

"Division 3: Forest Operations and Techniques

CONSIDERATIONS

All forest operations, and particularly those relating to tree harvesting and stand establishment, must be planned and executed in a manner that will avoid unnecessary conflict.

It is necessary to deal with all the aspects of forest labour and particularly employment factors, work environment conditions, and reduction of the more arduous aspects of forest work.

Forest operations must be adaptable to the specific technical and biological conditions which exist in the forest.

Technical and biological considerations are influenced by a wide variety of terrain, (i.e., slope, ground roughness and ground strength) climate and stand conditions.

RECOMMENDATIONS

Increased research is needed with regard to integrating forest operations as a whole in order to find the best compromise for social, silvicultural, technical and economic consequences.

Research dealing with the labour aspects of forest operations must continue with particular emphasis on ergonomics, a safe working environment and training at all levels of forest work with the objective of improving conditions that will provide a better work place for forest workers.

Research should lead to the production of increased volumes of industrial wood and fuel wood from individual trees as well as from the existing forest land base and from additional areas.

Research is needed to adapt operational techniques to the variety of conditions imposed by terrain, climate, silvicultural and socio-economic factors.

Special attention should be given to the requirements for research of particular value to forest operations in developing countries" (IUFRO 1981a, pp.192-193).

"Division 4: Planning, Economics, Growth and Yield, Management and Policy

CONSIDERATIONS

Forests are increasingly endangered by clearance, overcutting, air pollution and other factors. Many governments do not have accurate information on the changes which are taking place.

Many communal and non-industrial private forest lands produce timber, other goods and services far below their potential, while at the same time the demand for forest products is rapidly increasing.

The rapidly growing area of even-aged forests around the world emphasizes the importance of thinning. The intensified application of modern technology to thinning operations creates substantial problems.

The multiple-use concept of forest management will be increasingly applied on forest areas around the world.

It will therefore become more important to be able to quantify the value of the different goods and services produced.

RECOMMENDATIONS

Research into efficient methods of forest inventory should be intensified. Particular attention should be paid to monitoring the changes in the world's forest and wood resources. Also the research on sustained yield of natural forests should be emphasized, taking into account the special problems posed by the complex structure of tropical forests.

More research effort should be devoted to the improvement of communal and non-industrial private forest lands and, where appropriate, to the mobilization of their timber output. There should also be more intensive investigation into the role of forests for their owners as well as for community development.

Scientists of different disciplines should cooperate more intensively to analyze the biological, technical and economic aspects of thinning.

Researchers should develop and apply methods of evaluating the outputs of multiple-use forestry in economic terms. Research should also be devoted to combined agricultural and forestry production systems and to methods of monitoring ecological change, especially in tropical forests" (IUFRO 1981a, pp.194-195).

"Division 5: Forest Products

CONSIDERATIONS

The existing forests will be inadequate to meet future demands of wood and plantations of fast-growing species will be required to supply man's needs.

The characteristics of wood are determined by environmental, silvicultural and genetic factors.

Some properties of wood differ during the first 25 years of tree growth.

Large volumes of wood with different or difficult properties are available from unfamiliar tropical tree species.

RECOMMENDATIONS

Increased attention should be directed to the selection of plantation species with timber acceptable for use and lo the improvement of its quality by biological techniques.

The features and properties of the juvenile wood of fast-growing species should be determined.

There is a need for increased research into the classification of the wide range of species into a small number of end-use categories so that the use of wood is matched to its properties rather than its botanical identity.

The efficiency of forest utilization should be increased through greater conversion of the tree to a range of products, preservation of the products to ensure longer use and the development of structural designs to use the products more efficiently.

High priority should be given to the research and development of efficient conversion of wood to energy by the efficient use of solid wood in simple stoves and Industrial boilers as well as conversion to gaseous and liquid fuels" (IUFRO 1981a, pp.196-197).

"Division 6: General Subjects

CONSIDERATIONS

There is an increasing pressure on the land in many areas and a growing need to land-use planning.

The sum of knowledge is increasing at an accelerating rate. This knowledge has continually to be communicated to foresters in the field.

Forest history can make a valuable contribution to a better understanding of the various factors involved in the development process. There has, up to now, been relatively little activity in this area.

Mini- and micro-computers will play an increasing role in the processing of research data.

Most of the research projects in forestry have a practical aim.

The recreational possibilities of forests will become increasingly important in the developed countries.

RECOMMENDATIONS

Efforts should be made to support a continual flow of satellite digital earth resources data to all countries of the world without security restrictions.

Existing information services should be promoted and new services established, to keep pace with research activities in general.

Research into forest history should be increased.

Forest research projects should include provision for the practical application of the results of the research.

Multiple use of the forests, necessitates a multidisciplinary research approach" (IUFRO 1981a, pp.198-199).

The XVII IUFRO World Congress in 1981 has also adopted a joint Declaration of the World Bank, FAO, and IUFRO as follows:

"WORLD BANK/FAO/IUFRO: Forestry Research Priorities in Developing Countries

CONSIDERATIONS

The World Bank and FAO have reviewed research needs· in developing countries and have demonstrated that traditional forestry research is not making a sufficient contribution to rural development, energy production and forest conservation.

Existing institutional arrangements for coordination and support are inadequate to meet the needs for promotion of research in developing countries.

The resources allocated to research in developing countries are insufficient.

RECOMMENDATIONS

Additional research is required to maximise the contribution of forestry to rural development (emphasizing the role of forests and trees in agriculture), to energy production and use, and to forest conservation.

Governments, multilateral international agencies and bilateral donors should review their forestry policies and support the efforts of the World Bank and FAO in generating strategies for the expansion of research and its redirection towards currently perceived needs.

IUFRO itself should examine its own structure in the light of such needs and consider modifying its organization to take full account of changing emphases in forestry.

Governments, aid agencies and IUFRO should examine ways and means of generating additional funding needed for strengthening research related to forest resources in developing countries with the primary emphasis on improving the capability of national institutions.

Governments, aid agencies and IUFRO should consider the need for, objectives of and organization of alternative institutional arrangements for supporting national research institutions" (IUFRO 1981a, pp.200-201).

Excursions

Excursions are usually one of the most impressive and pleasant events of any Congress. Participants of this Congress could choose one of the 14 offered excursions for 3-5 days each:

1. Management of natural forests in the cool-temperate zone and forest management techniques in the artificial forests of *Cryptomeria japonica*
2. Forest fertilization
3. Erosion control and forest hydrology
4. Forestry in the sub-frigid zone
5. Forestry in the warm-temperate zone
6. Forest pathology
7. Forest entomology and wildlife
8. Forest road system and mechanized operations in mountainous regions
9. Growth and yield, management and remote sensing
10. Wood industry
11. Wooden buildings, past and today
12. Forest recreation
13. Traditional wood technology and modern wood industries
14. Forestry and natural parks

The excursions were excellently organized. One group consisted, as rule, of 40-50 people from 15-20 countries. The delegates from the USSR participated in two excursions: A.S. Isaev took excursion # 7 (IUFRO 1981a, p.301-302) whereas G.I. Vorobyov, N.A. Moiseev, I.K. Ievin, S.E. Vomperskiy and N.N. Larionova went to Excursion # 9 (IUFRO 1981a, p. 306-308).

Route 7: Forest entomology and wildlife. The excursion was held on September 13-17, 1981, and attended by 39 people from 14 countries.

At stops through the excursion, the participants observed well-organized displays for several important forest insect pests and their damage. In addition, they had chances to see some excellent man-made forests and enjoy sightseeing in the Chugoku district. The discussion was focused on the pine wood nematode (*Bursaphelenchus xylophilus*)[230] and Japanese pine sawyer (*Neodiprion sertifer*) because the participants observed the severely damaged pine forests almost all through the excursion course. The development of control methods, such as chemical spraying, breeding of nematode-resistant pine trees and so on, attracted the attention of the group.

Sugi (*Cryptomeria japonica*, Japanese cedar) is the most important tree in Japan, and the sugi bark borer, the most important pest, was discussed in several places. In addition, the group saw some injurious insects in the forest nursery and the seed orchard. The participants gained much knowledge about Shiitake mushrooms, seeing the places of production, specimen, etc.

During the trip, the participants could see sites of afforestation in dunes and wildlife in Japan. At the Tottori University Forest, hardwood research and a cable crane with three supports were explained and demonstrated. In the Shimane Prefecture, the participants could see the beautifully trimmed Japanese black pines called Tsuiji-matsu which form the windbreak located particularly on the north and the west sides of each house. At the last stop, Miyajima, in the Hiroshima Prefecture,

[230] Nematodes penetrate inside a tree and kill it within a few weeks. In the 1980s, Japan lost from 1.5 to 2.0 million m^3 of construction timber due to the disease, caused by *B. Xylophilus.* http://www.rsn-msk.ru/home/Sosnovaya_drevesnaya_nematoda/ Accessed on May 21, 2014.

the project for pine wilt control and its successful results were explained. Besides the field observations and discussions on forest entomology and wildlife, the participants were acquainted with the Japanese culture, customs and were delighted to hear good wishes of the people at each stop.

Route 9: Growth and yield, management and remote sensing led from Kyoto to Tokyo through the Gifu, Aichi, Shizuoka and Yamanasi Prefectures. In these visited areas, the group saw some typical native forest types such as forests of the warm temperate zone, temperate zone, and sub-frigid zone; and also the soil and climatic conditions of the forest limit at Mt. Fuji. This excursion had been expected to attract the same number of foreign participants as the other tours, i.e., 40 people, but it was attended by more than 90 people. The participants got the opportunity to see almost all tree species, used in forestry in Japan; various silvicultural activities, including clear cutting and selective cutting, forest nursery, regeneration (artificial and natural), weeding, pruning, thinning, final cutting, law landing, specimen of artificial crinkled logs and the cultivation of *shiitake* (a Japanese mushroom).

As the main topics of the excursion, some examples of well managed forests were visited. They were managed under various ownership patterns such as national, community, private forests (both large and small scale) and shrine forests, including permanent sample plots for thinning, growth and yield observations. Finally, the excursion visited the Hakone and Mt. Fuji national park where forests were primarily managed to meet recreational needs. Basic information on the wood industry and timber market was gained through visiting the Nagoya timber port and wood industrial area. Besides the information about each visited site, the excursion included a presentation with slides and graphs about Japanese remote sensing applications. Practical forest operations such as pruning, logging and bucking were demonstrated at each sample plot.

The first day (September 13, 1981) started with an inspection tour of the intensive forest operation system and selective cutting areas in privately owned forests in Imasu, then the tour visited the Nagoya timber port and wood industrial area.

The second day (September 14, 1981) included visits to: a typical national forest and a private forest management area and a wood products exhibition. In addition to this core course, a sightseeing course was offered to visit a forested and rural area. This tour visited memorial houses, keeping the old rural way of life and the famous temple, Horaiji, on the top of the Horai Mountain.

On the third day (September 15, 1981), the group had a guided tour to the famous artificial forestry association in Tenryu, including the old Sugi stands at the Akibe shrine.

On the next day (September 16, 1981), the tour started with a visit to the Hakone and Mt. Fuji National Park after seeing a permanent plot to get the data on thinning in the Sugi forest. The final stop was in a natural pine forest.

On the last day (September 17, 1981), the participants watched films about the aspects of natural environment, including wildlife habitats. At the same time, a short explanation of forestry remote sensing usage was given at the Fuji Visitor Centre before going up to the middle stage of Mt. Fuji which was 2,300 m high. The participants could enjoy the landscape of the upper timber line.

Soviet/Russian participation

The USSR delegation consisting of six persons participated in the work of several IUFRO Divisions: G.I. Vorobyov, Chairman, USSR State Forestry Committee (Division 4) and N.N. Larionova, International Department, USSR State Forestry Committee (Division 1); S.E. Vomperskiy, Laboratory of Silviculture, USSR Academy of Sciences (Division 1); I.K. Ievin, *Silava* Research and Operation Association (Division 3); A.S. Isaev, Institute of Forest and Wood, Siberian Branch of the USSR Academy of Sciences (Division 2); and N.A. Moiseev, USSR Institute of Silviculture and Forestry Mechanization/VNIILM (Division 4). It should be noted that most delegates were among the authors of the book, published in the USSR on the occasion of the

Congress and called *Research for Forests of the Future* (Научные исследования для лесов будущего 1981) which, perhaps, remains unique. Soviet scientists delivered 10 contributions, including verbal presentations, posters and additional papers, and, Professor G.I. Vorobyov, Head of the Delegation, Chairman of the USSR State Forestry Committee, made the Congress at its Closing Ceremony.

At the 17th IUFRO World Congress, Professor Nikolay A. Moiseev, Director, VNIILM, was elected Member of the IUFRO Executive Board for the USSR; he was also the USSR's Representative in the International Council. Dr. Imant K. Ievin, Director, *Silava* Research and Operation Association, was his Alternate in the International Council. Dr. Nina E. Sudachkova (VNIILM) was nominated for the IUFRO Scientific Achievement Award for successful studies in forest plant biochemistry (IUFRO 1981a, p.338).

After the Congress, the most representative involvement of our scientists in IUFRO research units was found in Division 4, with Dr. V.A. Chuenkov included in Subject Group S4.04-00 (Forest management planning and managerial economics); Dr. I.K. Ievin included in Project Group P4.02-00 (Economics and harvesting of thinning); Dr. G. Yakosin included in Project Group P4.09-00 (Forest sector modelling); A.F. Tsekhmestrenko included in Project Group P4.10-00 (Analysis of world trade in forest products) where he was to work together with future IUFRO President Dr. R. Seppala from Finland. In Division 2, Professor A.S. Isaev joined Subject Group S2.07.00 (Entomology) together with such well-known forest entomologists as W. Baltensweiler (Switzerland), M.W. McFadden (USA) and F. Kobayashi (Japan). Other Subject Groups included Soviet scientists as well: V.I. Ermakov (2.02.00), N.V. Starova (2.03.00); B.V. Chernyshev (3.02.00: Operational methods in the establishment and treatment of stands), earlier, this group had included G.A. Laryukhin (IUFRO 1980; IUFRO News 1981).

Interesting facts

It was for first time in the 90 year IUFRO history that the Congress was held in Asia.

It was also the first Congress, attended by more than 1,500 people (including delegates and their accompanying persons).

The Congress Proceedings were published in 8 volumes, containing a total of 4060 pages, and the six volumes of the divisional proceedings with invited papers (over 3,200 pages) were presented at the beginning of the Congress (given to each participant during registration).

Altogether 155 meetings were held during the Congress in 30 groups with the presentation of 330 invited papers and 257 voluntary papers.

In addition, 248 posters were displayed in various sessions (IUFRO 1981a). Such arrangements were a fairly efficient way to convey information about a broad range of activities in a prompt manner. Each IUFRO Division displayed its posters in a separate hall. The posters were available for demonstration during the whole time of the Congress, and at special sessions (one hour each), participants could see the poster and talk with the author or simply read the summary in the Congress Proceedings (Burkhart, Berntsen 1982).

It is also worthwhile to mention the FAO/World Bank/IUFRO symposium on Forest Research Priorities in Developing Countries, held during the Congress as well as two IUFRO/ MAB meetings (IUFRO News, 1980).

It would be interesting to look at the minimum costs of participation in the Congress in the prices of that time. As of December 1980, the estimated expenses, including travel costs (offered by the Japanese airlines), registration fee and an in-Congress and post-Congress excursion are shown in the Table below (IUFRO News, 1980).

Departure from	Copen-hagen	Frank-furt	London	Paris	Vienna	Rome
Currency	DKr	DM	Pound St.	FF	AS	It. Lire
A Congress + Excursion	10,940	4,112	1,019	8,970	29 235	1,635,000
A + B + Korea	12,510	4,620	1,137	10,210	32 800	1,809,000
A + C + Taiwan	13,730	5,014	1,241	11,200	35 600	2,005,000
A + D + Indonesia	16,360	5,901	1,424	13,300	41 900	2,438,000
A + F + Philippines	14,650	5,302	1,301	11,900	37,650	2,191,000

The IUFRO Executive Board met in 1985 in Kuala Lumpur before the Congress to be held in a socialist country for the first and adopted a number of important decisions. IUFRO President D. Mlinsek shared his thoughts about the situation in the forest world which occurred to him after the trip to Kuala Lumpur (IUFRO News 1985, pp.2-3).

* * *

The late 1950s - early 1960s saw the emergence of many new countries on the political map of the world: former colonies of European metropolises in Africa, Asia, Latin and South America became independent. Efforts to build a new life and structural economic changes significantly increased pressure on natural resources, especially forests. The forest cover began to reduce due to intensified agricultural uses, infrastructure development, housing construction for the rapidly growing population, growing fuelwood consumption, especially in developing countries, beginning to build their own states. Former colonies were becoming actively involved in international processes, including IUFRO Congresses, to gain valuable knowledge, experience and support of their colleagues around the world. The IUFRO membership was rapidly growing and its geography continued to expand.

Immediately after the IUFRO Congress in Vienna in 1962, *Silent Spring* by Rachel Carson was published (re-published in 2002 to mark the 40th anniversary of its first publishing) (Carson 2002). This book had a strong effect on human thinking, raised people's awareness not only of responsibility before nature, but, first of all, before themselves, their health and health of their children and grandchildren. The book raised the issue of human health in the context of the aggravating problems of environmental contamination: air, water, soil pollution and, as a result, the human body due to poisonous industrial emissions or effects of pesticides, used in agriculture and accumulating in the human organism.

Forest research was to revise its aspirations and goals, primarily, in response to the environmental, economic and social changes and challenges. The so-called *acid rain* emerged as a subject of research work; other new research areas included air pollution, water-conservation and water-purification forest services, soil contamination, etc.

In 1972, the United Nations Conference on the Human Environment was held in Stockholm and adopted its historical decisions for the humankind (Перелет 2003, p.10). Though the word '*forest*' was not mentioned at the Stockholm Conference and the word '*research*' was mentioned only once, foresters perceived it as guidance for action and embarked on the development of new areas in forest experimentation and forest science. Unrestrained growth was now viewed derogatevely. New reports (e.g. to the Club of Rome) contained messages about the natural scarcity and need to reduce the population on the planet. Alternative reports advocated sparing attitudes to resources and showed that achievements in science and technology provided chances for the humankind.

The Congress in the USA (1971) had the title: *The Role of Research in the Intensification of Forestry Practices and Activities*, and its resolution contained only one paragraph – about gene

resource conservation. The Congress in Norway (1976) paid more attention to sustained forest use, technical, ergonomic and safety criteria into the scope of forest research, etc.

During that period, IUFRO celebrated its 75th anniversary during the Congress in Munich, Germany (1967), and its 80th anniversary was celebrated during the 7th World Forestry Congress in Buenos Aires (Argentina) in October 1972. As for the 90th anniversary of its first Congress, IUFRO celebrated it "without red carpets". In the USSR, e.g., it was noticed only owing to the article of Professors I.S. Melekhov and N.A. Moiseev, published in a periodical, which, in particular, read: "Currently, IUFRO is a very representative international organization, covering all areas of forest science. It brings together more than 500 different forest research institutions, including universities, and about 10,000 scientists from more than 90 countries. From our country, three research institutions have joined the Union: the Institute of Forest and Wood of the Siberian Branch of the USSR Academy of Sciences, All-Union Research Institute for Silviculture and Forestry Mechanization (VNIILM), and the *Silava* Research and Operation Association. According to its Statutes, the overarching goal of IUFRO is to develop international cooperation in forest sciences, including not only forestry, but also the whole set of forest technology, forest economics and other sciences, associated with the forest and its products" (Мелехов, Моисеев 1982, pp. 127-128).

In 1982, IUFRO celebrated its 90th anniversary. Professors Melekhov and Moiseev described the elapsed period as follows: "Prominent scientists from around the world were actively involved in its activities. Those included Professor Hesselmann (Sweden), known for his research in the field of forestry and forest soil science; Austrian scientist A. Schiffel, who discovered important regularities in the structure of forest stands; Professor A. Bühler from Germany, known for his fundamental works in silviculture, in particular, the study on the demand of trees for light, and the two-volume 'datasheet' on forestry (especially, artificial reforestation); Professor H. Burger from Switzerland whose research on the dependence of forest productivity on soil physical properties, as well as a study on transpiration of trees, made a significant contribution to silvicultural science in his time; Professor L.Fabricius from Germany, a scientist with a wide scope of knowledge, who studied forest science, silviculture and use of forest and its products; Professor Lönnroth from Finland, well-known for his study of the structure and development of even-aged pine forests; Professor E. Saari (Finland), a major specialist in the field of forest statistics; A. Pavari form Italy, well-known for his works in introduction of tree species; G.F. Morozov, classical scholar of Russian silviculture; Soviet Academician V.N. Sukachev, and others. They were IUFRO scientists of the older generation.

In the 1960s and 1970s, major contributions to science and IUFRO development were made by H. Leibundgut (Switzerland), A. Philippis (Italy), E. Björkman (Sweden), L. Leyton (United Kingdom), G. Jemison (United States), I. Samset (Norway), W. Liese (Germany), (A. Métro) (France), V. Holopainen (Finland), B. Keresztesi (Hungary), M. Vyskot (Czechoslovakia), T. Satoo (Japan), and others; during this period, Soviet scientists became much more active in IUFRO" (Мелехов и Моисеев 1982, p.127).

During that short period, IUFRO decisively expanded its activities after its Congresses in North America and Asia to become a truly global organization and demonstrated its political neutrality through deciding to hold its next Congress in Yugoslavia.

Part Six
New Paradigm (1982-2000)

Chapter 23
Congress XVIII – September 7-21, 1986, Ljubljana, Yugoslavia

This section draws from documents of the 18th IUFRO World Congress, held on September 7-21, 1986 in Ljubljana, published by the Organizing Committee of the Congress (IUFRO 1986a-l) as well as papers or interviews of the Congress participants (Morandini 1986; Whitmore 1987; Mastrantonio 1987), as well as V.S.Shalaev and N.A.Moiseev.

Overview

The 1986 Congress was the first and the only IUFRO Congress, held in a socialist country. The 18th Congress was held under the title: *Forestry Science Serving Society.* It was attended by 2,247 registered participants including 1,876 active participants and many visitors from 73 countries. In the number of participants, Yugoslavia was in the lead (accounting for nearly a quarter of all participants (520 delegates), followed by the USA (170), Japan (128), Germany (100), and Sweden (76). The agenda included 5 plenary sessions, 605 presentations (with 38 papers of the scientists from the USSR) and 16 thematic excursions (1986a-h).

There were four Interdivisional Sessions and four Satellite Meetings organized by some of IUFRO members during the Congress (IUFRO 1986f). Two sessions of 1.5 hour each were organized to discuss 381 posters, submitted by all the six Divisions and listed in a special poster program (IUFRO 1986g). The Proceedings were published in eight volumes, containing 330 printed papers, including one volume of the Congress Reports. There were 239 different meetings (IUFRO 1986k).

"In 1986, IUFRO was already a major international organization that brings together over 500 forest research institutions from 89 countries[231]. However, the USSR was represented in the Union only by three organizations: the Institute of Forest and Wood, Siberian Branch of the USSR Academy of Sciences (Krasnoyarsk), All-Union Research Institute of Silviculture and Forestry Mechanization (VNIILM, Pushkino, Moscow Region) and the *Silava* Research and Operation Association (Salaspils/Riga, Latvian SSR)" (Моисеев 1986b, p.50). In that time, the Union united over 10,000 scientists from nearly 100 countries. "IUFRO operates on a slender annual budget of less than US$ 100,000 funded by member-agency dues. There are no salaried employees, other than the IUFRO Secretary and a clerk-typist who work out of IUFRO headquarters in Vienna; their services are provided by the Government of Austria. All scientists active in IUFRO operate as volunteers. The finest scientific minds in forestry donate their best to IUFRO, and that ingredient has kept the Union at the forefront of forestry research for nearly 100 years" (Whitmore 1996, p.22).

[231] In 1986, 159 countries were members of the United Nations Organization.

Scientific program

The Congress took place in the largest cultural centre - *Cankarjev Dom* – the Congress Centre, named after Ivan Cankar, classic of the Slovenian literature. The Centre had been opened in 1980, not long before the IUFRO Congress. Its main hall could accommodate 2,000 people.

On September 9, 1986, IUFRO President Dushan Mlinsek opened the Congress. Then, welcome speeches were delivered by Mr. Branco Miculic, President of the Federal Executive Council of the Socialist Federal Republic of Yugoslavia[232], Mr. Dusan Sinigoj, President of the Executive Council of the Assembly of the Socialist Republic of Slovenia[233], Mrs. Nusa Kersevan, Mayoress of Lyublyana, and Mr. M. Andrasek, Chair of the Congress Organizing Committee. From the international organizations, the welcome speeches were delivered by Dr. M.A. Flores Rodas, Assistant Director-General Forestry Department, FAO, and Professor S. Krasovec, Union of Slovenian Societies for Environmental Protection.

During the opening ceremony, IUFRO President Dusan Mlinsek presented his introductory paper, called *Future Research in Forestry* and noted that after World War Two, the forest condition had been rapidly deteriorating in all the continents. He also said that the IUFRO World Congress took place at a time when the situation became potentially fatal, and the Congress should fully recognize the disastrous situation in the forests, and critically evaluate its own role in the mistreatment of forests. The main task for scientists was to assess the situation and offer a way out. Rephrasing a well-known Latin expression (*Non est salus nisi in fuga)*, he said: "There is no *salus in fuga*[234]– no salvation in ignoring the crucial problems in forestry, which at the same time are the crucial problems of society in general. Forestry science is a part of general sciences and has to follow the basic sciences. The present, very sad, situation calls for even more: not only for new knowledge, but for wisdom which, when combined with the improved knowledge, is the only means to bring forests back into an ecologically and economically sound condition". He also stressed the following: "Traditional-ly, in forestry research, we have changed the character of forests. We must no longer do this. We have to preserve their real character, only slightly modifying it within the frame allowed to us by nature. We must return to trees, celebrating them as creators of earth's fertility. We have to change our philosophy and give up the industrial way of thinking, which has heavily spoilt the forests. We are at the turning-point. We have to create new forests and to maintain what remains of existing ones. This is the sacred duty of forestry and of its research".

Past President W. Liese made a presentation about future research in forest products, showing research prospects for the benefit of global forest industry. He identified a number of future research areas such as Demand and Supply, Fast growing plantations, Residues, Adhesives, Wood preservation, Chemical utilization, Lesser known species, Primary species, Timber for construction, Other lignocellulose resources, Information and Transformation, Interdisciplinary approach, and Declining resources for forest products research.

Keynote addresses were of great interest: e.g., on September 9, 1986, Dr. N.C. Brady (USA) talked about the role of research in arresting forest degradation. This presentation was also interesting because it proposed a new institution for the forest research coordination in developing countries – the International Council for Forestry Research and Extension (INCOFORE). Later on, the document was published and sent to IUFRO members and other stakeholder organizations (IUFRO 1989). The proposal to establish this Council was 'in step' with the proposals to up-date

[232] Prime-minister of Yugoslavia.
[233] Prime-minister of Slovenia.
[234] The original phrase is *Non est salus nisi in fuga (Lat.)* "Flight is the only refuge" OR "There is no salvation in flight".

the Tropical Forestry Action Plan (TFAP), coordinated by the FAO, and the Special Programme for Developing Countries (SPDC), which was ongoing, but require improvement.

Another keynote speaker – Russel Jim, Yakima Nations, USA – called his address: *Indigenous people – caretakers of the Earth* and drew attention to the harmony in the relationship of indigenous peoples and nature, preservation of traditions, language and culture of the people – forest dwellers. He said: "In our forest management practices, we try to dissuade clear-cutting. We try to maintain the protection, first of all, of the resource itself; next, the protection of the environment; and then, the protection of the animal habitat. In our forest management practices, we try to dissuade clear-cutting. We try to maintain the protection, first of all, of the resource itself; next, the protection of the environment; and then, the protection of the animal habitat. The animals are part of the cultural lifeline and a web of life that we all weave. The next is aesthetics, which we wish to see as the old way of looking at the forest. And the bottom line is the natural foods and medicines". He concluded with the following old Kenyan saying: "We did not inherit this earth, this land, from our ancestors. It was loaned to us by our children".

On September 10, 1986, Dr. Mansour Khalid, World Commissions on Environment and Development (Geneva), delivered his report, called *Environment and Forester's Responsibilities*, stating that an ability to meet man's primary basic needs, the need for food, was directly related to the fate of the forests. It urged the UN and the professional community to draw up an Action Plan to stop halt environmental degradation and to promote development without destruction of natural assets. Such a plan would embody three basic principles: 1) sustainable livelihood security for the poor should be the foundation for all development programs; 2) life support, economic policies should be re-oriented, and projects design criteria re-examined and modified to assure accelerated economic growth without detriment to life support systems and to promote livelihood security for the poor; and 3) new approaches of local authorities and national governments should ensure public participation in the formulation and implementation of development plans.

On September 11, 1986, Bernd Loetsch from Austria made his presentation, titled *Learning from Life*, in particular, he said: "Real needs exist in developing countries – all you have to do is to identify them and to adapt to the specific lifestyles of the trading partner, just as an organism adapts to a particular symbiotic relationship".

A. Trstenjak from Yugoslavia spoke about an anthropological approach to the forest on September 12, 1986. As if to follow up the thoughts, conveyed by Dr. Loetsch, he said that man could live a healthy life only in a natural symbiosis with the forest; and that the more he deprived the forest of its living cells, the weaker were his own cells and his strength to live. He also said: "This deep and strong bond between man and the forest has always been the source of man's creativity in all fields of art. What the forest offers and means to man is not only a refreshing strength to live and a certain economic value, which by numerous modern technologies can be considerably increased; it also represents a special kind of music and poetry, architecture and beauty and through all this, also an unknown mystery".

Many papers were highlighting the need for 'greener' forest management, especially in the post-war period. Many industrialized countries had begun to recognize an important role not only of wood, which was driving the recovery of war-torn economies, but also other forest functions and benefits for nature conservation, health, water regulation and conservation. The rapid expansion of protected areas, mainly in forest areas, was aimed at sustaining environmental protection, not only for flora and fauna, but also for humans. The social programs emerged in the forest sector.

Developing and developed countries had many common forest problems (Wikström 1987b). It was accounted for by the beginning of the post-modernism era, and the problems of land and resource use were rooted in metaphysical assumptions of society. While a better understanding of

nature in biophysical terms was essential, land-use problems could not be solved through reform. Solutions would depend on a fundamental change in the way people thought, on a new theoretical framework consistent with the way nature functioned… The failure of foresters of the 1960s and 1970s to respond to change was institutional, but in an unexpected way. Rather than forestry leadership, it was the technical staffs who held back progress. They did not understand the problem ontologically, and could not escape the epistemological demands of their specialties, e.g., some problems originated outside the forest sector (Wikström 1987a, p.z0001).

The development of industry and agriculture led to air and water pollution; so, in many places technical and biological rehabilitation of land was required. Greening of forest use had such forms as changed or decreased clear-cutting with increased selective cuts, reduced use of heavy machinery, improved reforestation and thinning technologies, etc. In sustainable use of forest resources, more attention was paid to reducing losses at all stages of wood harvesting, processing and utilization. Composite materials, non-waste technologies and recycling programs, especially for paper, were under development. On the other hand, this led to a reduction in wood consumption in home building and other spheres where forest products, primarily wood, were replaced with metal, plastic, cement.

One of the authors of this book participated in sessions of Division 5 (Forest Products) in accordance with his professional interests. Below is a more detailed description of the work of the Division which received over 50 reports on wood science, wood-based composite products and other related issues. The plenary session highlighted problems arising from the utilization of wood in construction. One of the most interesting papers was that of W.A. Dost (USA), describing trends in utilization of wood as a building material in North America. It is worth to note the extensive use of wood in construction, it pertains, in particular, to glued beams, floors, large enough load-bearing structures and as a finishing material. The paper discussed glued constructions, based mostly on hardwoods both ennobled and not. Demonstrated designs had high fire resistance, low deformability, high durability and antiseptic properties. The presentation was well illustrated. Unfortunately, technological aspects of production of glued structures were not disclosed, but the bibliography in the text allowed for detailed examination of additional information. The papers of C.E. Arbaiza (Peru) and F.O. Tesoro (Philippines) discussed the use of wood in construction in Latin America and Southeast Asia as a simple construction of summerhouses, built of local round-wood.

In particular, J.D. Brazier (UK) presented a very interesting paper about wood quality management, showing relationships between strength and age characteristics of materials from coniferous and deciduous tree species and the optimum ratio of these characteristics. Such a methodical approach to analysing wood properties deserved special attention because it enabled to set an optimal time of technical maturity. J. van Buijtenen (USA) assessed the needs for research, related to wood quality and stressed that we were beginning to understand that genetics and forestry could serve as a tool to influence the properties of wood. A better understanding of the interaction between genetics and the environment in wood production was needed. For a more in-depth study of the physiological process of tree growth and wood formation, it was good to use not only traditional methods, but methods of molecular biology.

During the discussion, an important question about flammability of wood constructions was raised. This theme was developed by S. Ishihara (Japan) in his paper, demonstrating antiseptic wood constructions resistant to fire, but without recipes of antiseptics.

Five papers discussed studies on drying regimens. J. Hartly (Australia) presented a study on hardwood veneer drying; he provided a competent overview and identified ways to intensify drying regimens for selected tree species. Several speakers from the USA (H.N. Rosen, R.E. Bodkin and K.D. Gaddis) addressed energy saving in wood drying through heat regeneration. It was assumed that the so-called binary cycles (when two coolant with different properties participated in the drying

process) could regenerate heat of one coolant through using the other one. An efficiency analysis was presented to show the feasibility of these drying methods. Unfortunately, the papers did not provide an economic analysis. A session of the same section heard the paper, submitted by Professor Boris S. Chudinov (USSR) and titled: Water in Wood: Problems, Achievements and Perspectives.

Many papers covered woodworking. They included a noteworthy study by H. Sugihara (Japan) on log processing with band saws. High performance and good quality of sawing large diameter logs appeared very promising for our conditions. H.A. Huber (USA) demonstrated the use of laser for sawing thin logs, although the quality of the exhibited sample was not high enough. V. Herak (Yugoslavia) compared various sawmilling technologies for processing of short-length oak timber blanks for furniture and flooring. V. Hitrec (Yugoslavia) presented extensive experimental data on the influence of some technological factors on outputs of frame sawmills. Valentin S. Shalaev (USSR) made a presentation on the trends in intensification of sawmilling.

It is worthwhile to note papers, demonstrating technology and organization of hardwood processing. A large group of papers was devoted to the influence of pollution on wood structure and quality. In particular, N. Torelli, K. Cufar, D. Robic (Yugoslavia) identified quantitative indicators of deteriorated properties, resulting into dieback of forest stands, exposed to contamination. Methods, based on histometric and dendrometric analysis allowed obtaining data that described and confirmed dieback of spruce in Slovenia. Thematically similar papers were submitted by J. Bauch (Germany), R. Jagels (USA), H. Schulz (Germany) and others.

Several papers showed results of studies to define structural characteristics, properties and end-use requirements for wood, especially from young trees. S. Lewark (Germany) presented an interesting paper on anatomical and physical differences between young and mature wood. In view of the global attention to the use of wood fuel, some papers discussed results of work to develop efficient combustion devices and power systems of small and medium sizes for burning wood and wood waste; a noteworthy paper was presented by J. Haygreen and P.G. Steklenski (USA).

An important paper was presented by T. Malony (USA) to discuss terminology and product names and proposed a method of their unification. In particular, he pointed to the underdeveloped classification of composite products and lack of clarity in the definition of composite products. The paper offered a definition and classification by the type of composite products, and it could be useful for the development of relevant standards and regulations.

R.C. Tang (USA) presented generalizing methods for estimating the strength of wood based composite products. He provided an extensive review of respective efforts, based on key determinants and taking into account static and dynamic loads and temperature effects. The author showed diagrams to demonstrate the classification of composite products according to their properties and uses. Papers on technological modes of particleboard production were presented at the same session.

The session on composite products reviewed papers related to harmful effects of formaldehyde in wood-based board manufacture. E.g., B. Sundin (Sweden) described a study of formaldehyde formation in composite products, and W.Onisko (Poland) reviewed fibreboard production methods, aimed at reducing environmental pollution. Alexander N. Oblivin (USSR) made a presentation on the technological process of particleboard production (Technologisches Verfahren der Spanplattenproduktion) at this session.

A number of papers highlighted biotechnological links between cultivation of fast-growing tree species with their wood properties (D.E. Einspahr from the USA, Y.K. Ikemori and F.C. Martins from Brazil, B.J. Zobel and W.E. Ladrach form the USA – these papers were only providing information without explaining or detailing wood properties).

In the field of woodworking, there was a noteworthy paper (T.Prka from Yugoslavia) on

manufacturing wooden parts in the Yugoslav sawmills. Broad size standardization of parts made of hardwood to some extent allowed having high outputs of parts from oak lumber in Yugoslav factories. Every report was extensively discussed.

On September 9, 1986, two Interdivisional Sessions discussed Forestry Research for Socioeconomic Development and The Changing Character of Wood Resources and Implications for Future World Development, and on September 10, 1986, two more sessions covered Deposition of Air Pollutants, and Forestry and Energy.

A series of flagship interdisciplinary presentations reflected IUFRO's scientific focus. Those included: Bringing forest sciences to bear on socioeconomic problems of the developing world (R.E. Buckman, USA); Critical developments and obstacles to progress: the viewpoint of developing countries (M.A. Flores Rodas, FAO); Forest energy in developing countries: problems and challenges (G.T. Goodman, Sweden); Scientific research and afforestation of Nigerian savannas (D.E. Iyamabo, Nigeria); Forestry-specific monitoring systems/Forstspezifische Uberwachhunssysteme (J. Materna and K. Stefan, Austria); Bioenergy conversion processes: a brief discussion of the state of the art and environmental implications (R.P. Overend, Canada); Forestry research for socio-economic development: success story from Latin America (M. Silva Reis, Brazil); Forest-based socio-economic development and deforestation in developing countries – a feasibility study for a major research project (M. Palo at al., Finland); Deforestation perspectives in the tropics with a global view: a pilot quantitative human population growth approach (M. Palo and G. Mery, Finland); Linkage in forestry research: a Malaysian experience (Salleh Mohd. Nor and Chan Hung Tuck, Malaysia); Forest products utilization research in Asia (F.O. Tesoro, Philippines); Changing nature of global forest resources/La caractere changeant des ressources forestieres mondiales (R. Calinot, France).

Satellite Meetings were organized by: (i) the FAO (in the format of the 14th Session of the its Advisory Committee on Forestry Education); (ii) the International Association of Wood Anatomists (IAWA); (iii) students of the Forestry Faculty of the University of Ljubljana and from abroad Seminar (in the format of a seminar under the title: Students in Forestry), and (iv) the International Institute of Applied Systems Analysis (IIASA).

It is necessary to single out a new benchmark in the development of relations between IUFRO and FAO. In particular, the Congress discussed the Tropical Forestry Action Plan (TFAP). The need to develop such a plan was related to rural development with its new challenges for silvicultural research. So, the theme of Congress: *Forestry Research Serving Society* could not have been better chosen. Institutional capacity of developing countries to meet these research needs was quite low, as matter of fact, too low even to meet the most important social, economic and environmental development needs. IUFRO was at the forefront of addressing this issue, and played an important role in accelerating the process of development. The FAO was represented in the IUFRO Executive Board and was combatting hunger and malnutrition. However, it was actively pursuing additional goals of providing technical assistance, in particular, to stop deforestation and soil erosion.

The FAO had developed the Tropical Forestry Action Plan (TFAP) in close cooperation with the World Bank (WB), the United Nations Development Programme (UNDP), and the World Resources Institute (WRI); the TFAP was aimed at increasing the contribution of the forest sector to economic development and providing for forest conservation and development in developing countries. An important element of this Plan was forestry research because the collective notion of rainforest included moist rainforests, savannah forests, forests in desert areas, as well as specific types of forests, such as bamboo and mangrove. In addition, forest research should consider not only technical or ecosystem issues, but also profound social and economic factors, related to hundreds of cultures of people living in the tropics.

The IUFRO Scientific Achievement Award (SAA) was received by nine scientists (out of 67 candidates), including Dr. Wladislav Chalupka (Poland) for his extensive research in physiology of flowering in coniferous trees for the management of forest seed orchards; Professor Wolfgang Glasser (USA) for his investigations of utilization of lignin in high-value products; Professor Hamish Kimmins (Canada) for development of a simulation model to investigate consequences of intensive forest management for site productivity; Dr. Niels Koch (Denmark) for his comprehensive ecological and sociological studies on public use of Danish forests; Associate Professor Mitsuhiro Minowa (Japan) for development of a fundamental growth model theory to explain the relationship between forest growth and stand treatments; Professor Sten Nilsson (Sweden) for extensive research in harvesting, forest planning, forest economics, marketing and forest sector modelling; Dr. Jacqueline Robertson (USA) for development of a laboratory bioassay, analytical and statistical techniques for evaluating and predicting response of forest insects to chemicals; Dr. Roger Sands (Australia) for extensive research in stress physiology of trees and relationship between soil physical factors and tree growth; Dr. Tho Yow Pong (Malaysia) for research in biology and taxonomy of termites and important insects of tropical forests and plantations.

The IUFRO Distinguished Service Award (DSA) had been granted for the first time at the Congress in 1981 in Japan to Matsima Matsui. Between the Congresses, it was granted to Helmuth von Barner (Denmark) in 1983. At the Congress, other eight winners were announced; they were Gottfried Kronfellner-Kraus (Austria), William E. Warren (Canada), Sven-Eric Appelroth (Finland), Filimon Carcea (Romania), Hans M. Keller and Hansruedi In Der Gand (both from Switzerland), John D. Brazier (United Kingdom), and Frank G. Hawksworth (USA).

At the Closing Session, IUFRO President D. Mlinsek reported about IUFRO's activities during the 5 years and its structure, and President-Elect Robert E. Buckman spoke about IUFRO's future program. Professor Buckman started his address with the words, quoted by Sir Isaac Newton: "If I have seen further it is only by standing on the shoulders of Giants" [235]. In this spirit, he offered several observations about where the Union might be headed and identified the following five key objectives to be in the focus of the Union for its restructuring and further development:

(1) to streamline business operations because the internal management and operation of the Union had become increasingly difficult as it had grown larger and the issues it addressed more complex. It meant that the internal IUFRO governance required optimization of the Executive Board and Divisions' workload, and an enhancement of the format and content of IUFRO News as a communication instrument within and outside the Union;

(2) to seek ways to collaborate better with other organizations that were working toward similar ends – the FAO, the World Bank, the regional banks, UNESCO, UNDP, IUCN, WWF and other international organizations; with the entire bilateral donor community; and with the professional and scientific societies of the world such as as Society of American Foresters (SAF), the International Society of Tropical Foresters (ISTF), the International Union of Biological Sciences (IUBS), to reinforce our efforts, not to compete with one another in and to use IUFRO as a bridge to link different countries and continents;

(3) to address environmental issues, including tropical deforestation and atmospheric pollution; to address again the question of major programs that involved not only scientific issues, but social, environmental and political ones as well; as it was done, e.g., in relation to tropical forests;

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[235] *If I have seen further it is by standing on the shoulders of Giants* He used this phrase in the letter of February 15, 1676, to Robert Hooke. The words are attributed to Bernard of Chartres, philosopher of the 11-12 centuries: Lat.: *Pigmaei gigantum humeris impositi plusquam ipsi gigantes vident* – literally translated as "Dwarves perched on the shoulders of giants (or ancients), and thus were able to see more and farther than the latter".

(4) to be concerned about the continuing need to provide an independent and unbiased forum, as it had for nearly 100 years - a forum for scientists and users of science to meet, to exchange information, to cooperate on research and to address emerging issues; and

(5) to look at the success of agricultural research or the medical sciences to appreciate the importance of technology to an improved quality of life and address the social, environmental and economic problems of the world. In conclusion, he expressed the hope that the Union would do its share to better the lives of all people who derive their spiritual, aesthetic, and economic well-being from forests of the world.

Importantly, he referred to the proposal of the US Agency for International Development (USAID) to establish a computer link between research institutions of developing countries as a means of communication and promotion of forest science and experience, said that all our efforts combined were pitifully small compared to the needs of forestry around the world; and urged to reinforce, not compete with one another" (Mastrantonio 1987, p.25). He finished his presentation with the words of hope to meet again in 1990 at the next IUFRO Congress in Montreal, Canada.

Organizational matters

At its meetings, the International Council adopted important decisions on IUFRO administration for the period of 1987-1990. It also discussed the Five Year Reports of all the Divisions, SPDC, Report of the Yugoslav Congress Organizing Committee and the Committee for Young Scientists from Developing Countries.

Growing recognition of the need in the SPDC led to increased attention to it from IUFRO during the past three years. Supported by various donor agencies, the IUFRO SPDC organized two workshops – in July 1984 for Asia (*Increasing Productivity of Multipurpose Tree Species in Tropical Asia*) and in January 1986 for the Sahelian and north-Sudanian zones of Sub-Saharan Africa (*Increasing Productivity of Multipurpose Lands*). During the Congress, several special sessions were held to discuss forestry research in Latin America, Africa and Asia. As a follow up for the SPDC, IUFRO was going to consider a number of options, including the proposed International Council on Forestry Research and Extension (INCOFORE). The objectives of the INCOFORE included: (a) strengthening of national forestry research and extension capabilities; (b) development of forestry extension services; (c) identification of opportunities for donor funding of needed research and extension; (d) development of regional networks to focus on major forestry research problems; (e) fostering of "twinning" arrangements between developed and developing country institutions (Unasylva 1987).

Professor Robert E. Buckman from Oregon State University (USA) was elected IUFRO President (1987-1990), and Dr. Salleh Mohd. Nor from Malaysia Vice-President.

IUFRO Division Coordinators became members of the Executive Board: D1 *Forest Environment and Silviculture* – Helfreid Oswald (France); D2 *Forest Plants and Forest Protection* – Jeffery Burley (Great Britain); D3 *Forest Operation and Techniques* – Per Olov Nilsson (Sweden); D4 *Planning, Economics, Growth and Yield Management and Policy* – Harold Fred Kaiser (USA); D5 *Forest Products* – Robert L. Youngs (USA); D6 *General Subjects*, including recreation, information systems, remote sensing and forest history – Lars Strand (Norway). Only two Division Coordinators – R.L. Youngs and L. Strand were re-elected to their positions. Oscar Fugalli (Austria) became the Coordinator of the SPDC. This Programme was launched in 1983 to promote forest research in less developed countries, and proved to be effective as of the time of the Congress. In addition, representatives of the global regions were included in the IUFRO Executive Board: Fergal Malloy (Ireland) for Norther Europe, Eric Tessier du Cros (France) for Central Europe, Jiri Skoblik (Czechoslovakia) for Eastern Europe, Alejandro Lopez de Roma (Spain) for

the Mediterranean Region, Richard Skok (USA) for North America, Jeff A. Odera (Kenya) for Africa, Alan Gordon Brown (Australia) for the Pacific Region, Fujio Kobayashi (Japan) for Asia, R. Echenique Manrique (Mexico) for Latin America and the Caribbean; the Executive Board also included Marco A. Flores Rodas (Italy), representing the FAO, and three President's nominees: J. Cayford (USA), R. Morandini (Italy) and Imant K. Ievin (USSR).

Professor Nikolay A. Moiseev represented the USSR in the International Council.

It should be specially mentioned that for the first time in the history of Russian participation in IUFRO, the International Council awarded IUFRO Honorary Membership to a representative of the USSR: to Professor Ivan S. Melekhov, Academician of the USSR Academy of Agricultural Sciences. In the IUFRO Proceedings, it was noted that the IUFRO International Council elected Professor Dr. I.S. Melekhov (Member of the Soviet Academy of Sciences) IUFRO Honorary Member for his substantial contribution to IUFRO. Academician Melekhov supported the relationship between IUFRO and socialist countries. He also promoted IUFRO among forestry scientists in these worldwide important forestry countries.

Personalia: Academician I.S. Melekhov was born in 1905. He is a prominent scientist in the fields of silvics and silviculture. He has worked out new ways in research on silvics and silviculture and forest typology. He has published about 300 works on this subject, among them, many books and monographs. Many of Academician I.S. Melekhov's works are being used in practice in the USSR. In the past years, Academician Melekhov headed of the Department of Silviculture at the Arkhangelsk Forestry Technical Institute, at the Forestry Technical Academy in Leningrad and at the Moscow Forestry Technical Institute. He is the founder of the Institute for Forestry and Wood Chemistry in Archangelsk and was the first Director of the Institute (1958-1963). In the 1960s, he was Deputy Chairman of the USSR Committee for Forestry and Forest Industry. He was a leading forest scientist in the USSR. In recognition of Academician Melekhov's achievements, he was elected full member (Academician) of the USSR Academy of Agricultural Sciences[236]. In 1971, at the 16th IUFRO Congress (Gainesville, USA), he was elected Member of the IUFRO Executive Board from Eastern Europe. As a Member of the Executive Board, he contributed considerably to the reactivation of activities of IUFRO member organizations. His activities helped to increase the number of IUFRO member organisations from socialist countries.

"*Procedure:* The proposal for IUFRO Honorary Membership was made by Dr. Nikolay Moiseev, President's Nominee at the IUFRO Executive Board, during the 18th IUFRO EB meeting in April 1986 in Zurich. The proposal was unanimously adopted. The IUFRO Executive Board submitted the proposal for election to the International Council on September 7, 1986 in Ljubljana (Yugoslavia)" (IUFRO 1986a, pp.56-57).

It should be also noted that during the previous period, only 18 distinguished individuals were elected IUFRO Honorary Members. Professor I.S. Melekhov remains so far the only Honorary Member of IUFRO from the Soviet Union/Russia.

At the same time, the International Council elected Dr. W.E. Hillis, former Chief Research Scientist, CSIRO – Australia[237], as a IUFRO Honorary Member for his work in IUFRO, based on the vision of IUFRO as one of the few international organizations working in the modern world for a real improvement in the living conditions of all humankind and its future generations.

Montreal, Canada was selected as the venue of the 19th IUFRO World Congress.

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[236] The USSR Academy of Agricultural Sciences, later – the Russian Academy of Agricultural Sciences (RASHN). Now, it does not exist as it became part of the Russian Academy of Sciences (RAS).

[237] CSIRO is the Commonwealth Scientific and Industrial Research Organisation is the Australian Federal Government Agency for research.

Resolutions

The Congress adopted the following Recommendations on how to make *Forestry Science to Serve Society*. The below text of the Congress Resolution/Recommendations was taken from Unasylva (1987):

CONSIDERATIONS

The very survival and welfare of man depend on the maintenance of trees and forests and the continuation of the products, services and benefits they provide.

The socio-economic and environmental impacts of loss of these resources are not yet fully appreciated by the public nor completely understood by scientists.

Dramatic losses of forests, with consequent losses of soil and decline of soil productivity, are occurring in tropical countries because of expansion of agriculture, urbanization, over-exploitation of forest resources themselves, and increasing demands for fuelwood and other products. Rapidly increasing sizes of human populations, changing conditions in land tenure, and lack of social stability are serious political and cultural issues impeding solutions.

Equally threatening is the increasing damage to temperate forests caused by the polluting effects on the air, water, soil and trees by various industries, traffic and heating of houses. Although scientists have sufficient information to suggest provisional remedies, exact cause-and-effect relationships are not sufficiently known. The great impact of forest fires should also be considered.

The importance of research in attacking these problems is not fully recognized, and research is often inadequate, poorly conceived or not applied because of lack of financial and human resources and inadequate mechanisms for transferring results into practical resource management.

RECOMMENDATIONS

Governments and international development agencies, recognizing the socioeconomic importance of trees and forests, should provide the resources for research, development and application of appropriate, sustainable systems of resource management. They should re-examine urgently the social, political and economic issues underlying deforestation and pollution.

Forest services and professional foresters, recognizing the complexity of relations among forests, environments and national socioeconomic welfare, should appreciate the need for relevant research, particularly in tropical deforestation and temperate environmental pollution. Working together with researchers and extension foresters, they should mobilize and speed the transfer of scientific findings to hasten the solution of socioeconomic and environmental forestry problems.

Research and educational institutions, recognizing the limits of research resources, should develop methods of evaluating the benefits of research and of assigning priorities to research topics and should provide adequate training and career rewards for individual researchers. They should ensure that forestry research programmes are directed toward major challenges facing mankind to meet growing needs for food, wood and energy and to improve man's environment.

IUFRO, recognizing the threats to mankind posed by deforestation and pollution, should seek to expand its special programme for developing countries and to establish a parallel interdisciplinary programme on the causes, effects and integrated management of pollution.

New IUFRO programmes and existing research groups, recognizing the overriding international significance of these two major problems, and working with other research agencies as appropriate, should collect and synthesize existing information, define standardized methods for monitoring, study short-term management measures to keep forests

living, initiate long-term research on causes and effects, determine the relevance of knowledge to countries in which the problems are not yet apparent, and inform governments, administrations and the public."

Excursions

The 4-7 day post-Congress excursions were organized for the participants to demonstrate forest research facilities in Yugoslavia. Virtually, the entire Yugoslav forestry community was involved in the preparation of the Congress and its excursions. The purpose of the trips was to show the Yugoslav forest complex, to present the current situation, to discuss some successes and failures, development trends and, above all, to welcome the participants of the Congress at the institutions and schools and in the sites of forest institutions. Each route also included sightseeing and information about cultural facilities. The program included 20 routes, but actually, only 16 of them were held (IUFRO 1986a, pp. 379-409):

1. Mountainous forestry and forestation of the sub-Mediterranean
2. Cancelled
3. Harvesting and processing of high-value Slavonian oak – an integrated approach to silvicultural treatments
4. Genetics and improvement of forest tree species
5. Watershed management
6. Cancelled
7. Wood products and wood processing plants
8. Cross-section of forests and forestry between the alpine timber line and the low land in the north of Yugoslavia; die-back of forests
9. Small ownership forests and forestry
10. Cross-section of forests and forestry among the Pannonian plane, the Dinaric (Limestone) Alps and the Adriatic coast
11. Forest operations and techniques in mountainous mixed forests
12. Mixed natural forests of Bosnia and Montenegro
13. Cancelled
14. Cancelled
15. Mountainous forests of hardwood and softwood species and reforestation of degraded lands in Serbia and Montenegro
16. National parks of Macedonia, beech forest ecosystems and forestry in southern Yugoslavia
17. Forestation of semi-arid land and natural parks in the south of Yugoslavia
18. Forestry and mixed deciduous inland forests and the forestry of the sub-Mediterranean area
19. Transition from classical monoculture forestry to multipurpose forestry; harvesting in dying forests
20. Air pollution in forests.

Most of the excursions started on September 14, 1986.

Route 1. Mountainous forestry and forestation of the sub-Mediterranean (Ljubljana–Postojna –Sezana–Umag–Pula–Brioni–Pula–Ljubljana) 4 days. (Leaders: B. Anko, A. Golob, N. Komlenovic).

Day 1: Forest management control method. A century of beech-fir forest management. High Karst phenomena. Dormouse trapping. Day 2: History of Karst re-afforestation (Low Karst and its characteristics). A Karst village in the last 150 years. Massive spreading of forests in agrarian landscapes. Forest fires in the Karst region. The stud farm and riding school in Lipica. Day 3: Forest management in the Sub-Mediterranean. Improvement of Sub-Mediterranean forests, Nurseries in

Istria. Truffle (*Tuber magnatum*) growing. Urban forestry in Istria. Day 4: Brioni Islands. Brioni Memorial Park. History of Brioni. Vegetation&Wildlife of Brioni.

Route 3. Harvesting and processing of high-value Slavonian oak – an integrated approach to silvicultural treatments (Ljubljana–Zagreb–Slavonski Brod–Vinkovci–Sremska Mitrovica–Beograd) 6 days. (Leaders: S. Bojanin, S. Nicolic, F. Penzar).

Day 1: Final wood processing at Savric. Day 2: Lipovljani Training and Research Centre: Exploitation and cultivation of oak forests. Prasnik Nature Oak Reserve. Day 3: Slavonija, oak conversation, veneer production and wood impregnation. Borinci apple plantation – Visit to a typical Slavonian peasant house. Film about Slavonija. Sawmill in Slavonski Brod. Plant for impregnation of railway sleepers. Veneer plant (log storage, veneer production, final products). Day 4: Old Slavonian oak forests – exploitation and cultivation of forests (Slavonska suma). Oak forests in western Srem: Stara Smagva and Vinicna (Sremska Mitrovica). Archaeological excavations in the Roman town of Sirmium. First thinning in oak stands. Oak stands with longer silvicultural rotation. Briefing, demonstration of felling, cutting, skidding, loading and transportation of timber. Oak forests in Srem – Radjenovci. Day 5: Thinning in poplar plantations. Final cutting in poplar plantations. Chipping of wood. Pulp and paper plant. Central storage in the pulp and paper plant in Sremska Mitrivica. Day 6: Problems of exploitation and afforestation of sand dunes. Deliblatska Pescara: exploitation of forests cultivated on former quicksand and afforestation.

Route 4. Genetics and improvement of forest tree species (Ljubljana–Jastrebarsko–Zagreb–Djurdjevac–Zvecevo–Osijek–Novi Sad–Beograd–Ohrid–Dubrovnik). 6–8 days. (Leaders: M. Vidakovic, A. Krstinic, Z. Borzan).

Day 1: Visit to the Forest Research Institute at Jastrebarsko and experimental plots near Jastrebarsko. Improvement of European Larch through intra- and interspecific hybridization. Improvement of Serbian spruce (*Picea omorika*) through inbreeding and out-breeding. Variability of half-sib families of *Pinus sylvestris* from Bosanski Petrovac (Bosna). Day 2: Experimental plots near Djurdjevac. Improvement of two-needle pines. Clonal seed orchard and seed stand of *Alnus glutinosa*. Clonal test of White willow. The growth of White willow clones in association with Black alder. Furniture factory Gaj at Podravska Slatina. Day 3: Experimental plots of Conifers. Biomass production of hybrid poplars in short rotation. Provenance test of *Pinus densiflora*. Provenance test of *Pinus nigra*. Hybrids and clones of some two-needle pines. Provenance and clones of Incense cedar and Giant sequoia. Lisicine Arboretum. Planting of memorial trees. Day 4: Experimental plots with poplars at the Experimental Station of the Poplars Research Institute at Novi Sad. Alluvial soils along the Danube River. Improvement of poplars – Sec. Aigeiros. – Sec. Leuce. Poplar archives. Polyclonal versus monoclonal poplar plantations. Improved disease resistance. Day 5: *Pinus peuce* in the National Park of Pelister. Seed stand of *Pinus peuce*. Experimental plots with exotic species of conifers. Degraded forest of Quercus trojana in National Park of Galicica. Day 6: Botanical garden and vegetation of Lokrum Island. Trsteno Arboretum and experimental plot of Mediterranean pines. SPECIAL PROGRAMME: Day 7: Biotechnology. Stress genetics. Biomass genetics. Day 8: Clonal test in forestry. Strategies in provenance testing and breeding.

Route 5. Watershed management (Ljubljana–Jesenice–Tolmin–Opatija (Vinodol)–Sarajevo, (Konjic)–Skopje (Tetovo)–Beograd (Arandjelovac)) 7 days. (Leaders: A. Horvat, G. Micetic, V. Lubardic, M. Dordevic, M. Dorovic, R. Lazarevic).

Day 1: Control of water erosion and avalanches. Planica: regulation of the river course, winter sport centre. Jasna: control of erosion and regulation of the river course. Vrsic – mountain ridge on 1,611 m above sea level. Luijana Alpinetum in the valley of Soca. Soca: control of avalanches. Dressage of Lipicaner horses. Day 2: Control of erosion on flysch soils in Istria. Botonega Dam. Motovun Karbuna Museum: erosion of flysch and measures against erosion. Sub-Mediterranean

flora in Opatija. Day 3: Control of erosion and land-slides. Bay of Bakar: control of erosion. Slani potok: control of land-slides. Crikvenica: lunch. Bay of Kvarner and islands. Day 4: Control of erosion in the basins of Sarajevo and Jablanica. Winter sport centre. Regulation of the course of the Miljacka River in Sarajevo. Idbar: protection of Jablanica, reservoir against erosion. Regulation of the river Neretva in Konjic. Igman: winter sport centre. Day 5: Control of erosion in the valley of Skopje and Tetovo. Course regulation of the Vardar River in Skopje. Control of erosion and water utilization. Tetovo: barrages in the Pena River bed. Day 6: Erosion in Northern Serbia. Kalimegdan – fortress and panorama of New Beograd. Avala: erosion in Northern Serbia. Memorial cemetery in Sumarice – Kragujevac. Memorial Church in Topola – Oplenac. Paleolithic Museum in the Risovaca cave. Day 7: Rehabilitation of disturbed soils in the Kolubara coal-mining basin. Experimental anti-erosion station in Ralja.

Route 7. Wood products, wood processing mills (Ljubljana–Celje–Maribor–Varazdin–Bjelovar–Osijek–Belisce–Sremska Mitrovica–Beograd) 5 days (Leaders: S. Pirkmaier, N. Torelli, R. Sabadi).

Day 1: BOHOR woodworking enterprise, Sentjur, Celje Forest Enterprise, furniture factory with exhibition rooms, secondary school of woodworking industry in Maribor. Day 2: Sawmilling, bend-wood furniture, plywood, particle board. Production facilities of BOBIC FLORIJAN - MUNDUS at Varazdin: sawmill, laminated veneer manufacture, bend-wood furniture production. Production facilities at Bjelovar: sawmill, veneer mill, plywood factory, particle board factory. Day 3: Intensive management of oak forest stands in the Vrbovec Forest District, important wood supply area for Bjelovar's forest industries. Oak forest stands: management, thinning and logging operations. Day 4: Belisce Combinate Semi-cellulose pulp mill, packaging paper manufacture, corrugated packaging paper, and paper boxes factory. Kopacki Rit National Park, marshy area with a multitude of birds. Day 5: Sulphate bleached pulp & paper mill, based on broadleaved softwood timber, veneer mill producing high quality oak wood and ash wood veneers. Visit to the closely situated short rotation poplar plantations.

Route 8. Cross-section of forests and forestry between the alpine timber line and the low land in the north of Yugoslavia; dieback of forest (Ljubljana–Bled– Nazarje–Topolscica–Slovenj Gradec– Maribor–Murska Sobota–Zagreb) 5 days. (Leaders: M. Adamic, F. Ferlin).

Day 1: Multifunctional management in highland forests – production of high-quality wood. LIP Bled Wood factory – visit to the Recica door factory. Forest and management in an alpine area – Pokljuka highland plateau. Selective natural regeneration of spruce stands – consideration of quality and stability. Vegetation characteristics of peat bogs and management in the national park. Mechanical stability of stands and selective thinning. Day 2: Management in private highland forests – forests as a source of subsistence means. Ethnography of an Alpine village. Topolsica tourist and health centre. Typical example of mountain forest management. Alpine agroforestry farm. High-altitude farm – its forest – its existence. Silvicultural plan of the farm. Highlands – still unspoiled – how to preserve them. Ethnographic points of interest of a mountain village. Day 3: Multiple-use private forest management in highlands. Forest dieback. Cultural monuments of Slovenj Gradec. Private highland forest yesterday – today – tomorrow. Alpine agroforestry in Koroska. Forest dieback – a specific highland problem. Lovro Kuhar – a Slovene writer about the alpine socio-economic environment. Day 4: Multi-purpose management of deciduous forests in hilly area. Wood factory Marles – manufacture of kitchen furniture. Characteristics of forest and management in the lowland and hilly regions. Intensive tending of mixed deciduous forests – acceleration of quality and diversity. Small-area management in scattered private forests. Selective natural regeneration of farm forests. Late thinning of younger farm forest stands of deciduous trees. Day 5: Natural lowland forests – forestry, landscape and ecological potential. Historic and cultural sites of Pomurje.

Historical look into the cultural area of three nations. Characteristics of the Pomurje lowland forests and management. Black alder – important bioecological and economic species of the lowland. Selective thinning of old alder stands. Regeneration of alder forests – an exception in Slovenian forestry. Impact of micro relief on the selection of tree species in regeneration. Growing of narrow-leaved ash (*Fraxinus oxicarpa*).

Route 9. Small ownership forests and forestry (Ljubljana–Lasce–Ribnica–Dolenjske Toplice–Novo Mesto–Otocec–Celje–Slovenske Konjice–Radenci–Varazdin–Zagreb) 5 days. (Leaders: I. Smolej, S. Horvat-Marolt, S. Orlic).

Day 1: Forest management in Slovenia – Problems of farm forestry in Slovenia. Woodware – supplementary craft in the farm. Museum of wooden articles in the castle of Ribnica. Characteristics of forest management in Slovenia. Forest management area of Kocevje - a Slovenian phenomenon. Private forest in Dinaridi of Kocevje and specific aspects of its management. Woodlot management based on silvicultural planning. Beech as a species for future development. Production of wooden articles. Day 2: Management of mixed forests in southern Slovenia. Conservation of forests as a special task. Chartreuse of Pleterje. Characteristics of the forest management area in Novo Mesto. Problems of large private forest management units. Practice of management of small farm woodlots. Direct conversion of low-yield forests (clear-cutting). Indirect (gradual) conversion of low-yield forests. Day 3: Problems of forest management with limited resources. Farm forests as integral part of farm economy. Central problems of forestry in a hilly region. Celje regional museum. Enclosures as a particular form of private forest estates. Organizational form of private forest management. Farm-enclosures and their economy. Practice of silvicultural planning. Silviculture and wood exploitation in farm forests: systems and relations. Income in the Juzno Pohorje farm. Solid wood furniture – a chance for Slovenian forestry and timber industry. Day 4: Scots pine Management: Success of conversion in old stands and pole stands. Management of private forests in Slovenske gorice. Characteristics and problems of the Maribor forest management area. Management of Scots pine –a highly competitive species on shallow gravel soils. Increased value increment as an objective of forest management. Successful direct conversion (clear-cutting) of degraded autochthonous deciduous forests. Silvicultural objectives and tending of stands formed by direct conversion. Ptuj City and Museum. Private forest management in hilly areas. Day 5: Management issues in the privately owned forests of Upper Podravina.

Route 10. Cross-section of forests and forestry among the Pannonian plane, the Dinaric (Limestone) Alps and the Adriatic coast (Ljubljana–Osijek–Slavonski Brod–Zavidovici–Sarajevo–Mostar–Dubrovnik–Mljet–Dubrovnik) 6 days. (Leaders: I. Miklos, B. Kulusic, A. Bogner).

Day 1: Wildlife Reserve and Kopacki Rit Nature Park. Osijek – Movie: The Last Oasis. Day 2: Slavonian oak forests. Tending and protection of common oak forests. Departure from Nasice for Djakovo. Lunch. Djakovo Stud Farm. Djakovo Cathedral and Strossmayer Gallery. Day 3: Zepce – Krivaja: organization and products; Zepce Forest tree nursery. Zavidovici – Kristal Hotel – film about Krivaja. Zavidovici (Krivaja plants) – sawn timber, wood boards, profiled elements and furniture. Conversion of degraded beech forest (Distr. 236 of Gostovic management unit) of degraded pine and oak forests in conifer cultures. Day 4: Fir, spruce and beech virgin forest on Igman. Visit to the sports facilities in Trebevic and Igman. Day 5: Karst (barren rocky terrain) reforestation. Mostar cultural and historical landmarks. Day 6: Mljet National Park.

Route 11. Forest operations and techniques in mountainous mixed forests (Ljubljana–Idrija–Postojna–Ljubljana–Staza–Delnice–Plitvice–Opatija–Ljubljana) 6 days. (Leaders: S. Tomanic, M. Lipoglavsek, I. Grbac).

Day 1: Forest management under difficult conditions. The Soca Tolmin forest enterprise. The town of Idrija and management of Idrian forests in the past. Planning and sales of forest products.

Skidding under difficult conditions. Historical Idrian sluices for wood floating. Divje Jezero Nature Reserve. Franja Partisan Hospital. Day 2: Training of forestry personnel – development of timber extraction techniques in karst areas. Postojna forestry training centre. Development orientation of forestry. Management in the Postojna region. Pivka cental mechanization yard. Construction of the forest road network in the karst area. Skidding in highland karst regions. Day 3: Thinning operations of beech stands on hilly terrain. Forest management in the Novo Mesto region. Efficient thinning of beech stands. Preparation, cutting, bucking and skidding of beech wood. Ergonomic significance of the tractor and work stress of tractor drivers. Living conditions of forest workers. Use of computers in the Kosevje forest enterprise. Day 4: Management principles of uneven-aged forests in the Gorski Kotar region. Mountain/coastal Delnice forest enterprise. Harvesting of uneven-aged forests in mountainous conditions. Cutting and primary wood bucking. Skidding of round wood by tractor. Transport of timber by track. Zalesina educational and experimental forest site. Day 5: Primary wood bucking. Delnice wood industry enterprise. Cental mechanized yard. Sawmilling. Wood drying. Day 6: Plitvice Lakes National Park. Log skidding by horse. Extraction of firewood by horse. Tour to Plitvice Lakes. Day 7: Senjska Draga. The Senjska Draga phenomenon. Technical and silvicultural operations in Senjska Draga. Senj historical landmarks. Highlights of Opatija.

Route 12. Mixed national forests of Bosnia and Montenegro (Ljubljana–Sarajevo–Tjentiste–Niksic–Titograd–Cetinje– Bunda–Dubrovnik) 6 days. (Leaders: V. Lazarev, S. Izetbegovic, B. Soc).

Day 1: Sightseeing in Sarajevo (old town, Bascarsija, Mlada Bosna Museum, etc.). Day 2: Bjelasnica Carpentry Factory – Hadzici. Fir, spruce and beech Virgin forest on Igman. Selection forest of fir, spruce and beech on Igman. Sightseeing in Bjelasnica, Igman, Jahorina and Trebevic, sites of the 14th Olympic Winter Games. Day 3: Production of sawn timber, carpentry and kitchen furniture in Sokolac. Seed-stand of Scots pine in Knezinski Palez. Afforestation on continental karst near Sokolac. Production of fibreboard. Visit to memorial museum in Tjentiste. Day 4: Perucica virgin forest near Tjentiste. Javorak furniture industry – Niksic. Day 5: Afforestation of sub-Mediterranean species on limestone bedrock (Djemovsko polje near Titograd). Cultural and historical sites in Cetinje. Njegos mausoleum on Lovcen. Day 6: Cultural and historical sites in Dubrovnik.

Route 15. Mountainous forests of hardwood and softwood species and reaforestation of degraded land in Serbia and Montenegro (Ljubljana–Beorgad–Topola–Kragujevac–Vrnjacka Banja –Kraljevo–Novi Pazar–Sjenica–Plevlja–Zabjak–Titograd–Dubrovnik) 7 days. (Leaders: A. Mancic, D. Karadzic, M. Tabas).

Day 1: Coppice and conversation into high forests. Rehabilitation of soils, disturbed with surface coal mining. Visit to the Unknown Soldier Monument and TV tower on the mount of Avala. Chemical control of broadleaved sprouts in coniferous plantations. Conversion of low-productive forests through introducing exotic species. Lignite mining basin in Lazarevac – Kolubara the headquarters. An afforested area on disturbed soil (depositions) after surface coal mining. Skadarlija. Day 2: Topola church with mosaic adornments. Sumarice Memorial Centre (museum and park) in Kragujevac. Day 3: Artificial and natural regeneration. Coppice management. Uneven-aged mixed high productive forests. Artificial regeneration of barren land. Transformation of coppice forests of low commercial value into high yield commercial forest. *Pinus nigra* natural regeneration on serpentine sites. Investigation of increment and productivity of trees and stands on the Goc Mount. Day 4: Artificial regeneration of semi-arid barren land on serpentine. Studenica Monastery. Sopocani Monastery. Day 5: Artificial regeneration of barren land on the Pester plateau. Mileseva Monastery. Management of spruce, silver-fir and Austrian pine natural forests. Day 6: Durmitor National Park. Natural stand of Pinus nigra – Austrian pine at Crna poda. Biogradska Gora Natural Park. Forest plantations near Titograd. Day 7: Sightseeing: Cetinje cultural&historical monument. Njegos's mausoleum on Mt. Lovcen

Route 16. National parks of Macedonia, beech forest ecosystems and their forestry in Southern Yugoslavia (Ljubljana–Beograd–Kladovo–Bor–Despotovac–Nis–Kursumlja–Vranje–Skopje–T. Veles–Ohrid–Tetovo–Skopje) 7 days. (Leader: S. Stilinovic).

Day 1: Horizontal and vertical distribution of forest ecosystems along the Danube from Belgrade to Djerdap, Djerdap National Park. Djerdap: "Breaking through", Djerdap Lake, Djerdap Power Plant and Djerdap II construction site. Basic floristic and phyto-ecological characteristics of forest ecosystems along the Danube from Belgrade to Tekija (Sightseeing from a hydrofoil boat). National beauties of Djerdap (canyon, lake). Forest management, development of wood industry and hunting in North Kucaj. Gamzigrad archeological site. Day 2: Virgin beech forests at different stages of their conversation into managed forests. Nature reserve of beech forest, floristic, dendrologic and phytocoenologic aspects, development characteristics. Manasija monastery (Resava) – Serbian Literature Centre of the Middle Ages (history, architecture, frescos). Day 3: Wood industry in Eastern Serbia. Development of wood industry, present capacities and programs, future development of the corporation. Torrents control in the South Morava River basin. Jovacka River: active landslide and man-made lake. Development of wood processing, production of furniture, present capacities, future development of the Simpo corporation. Day 4: Afforestation of semiarid regions of Southeast Serbia and Northeast Macedonia. Afforestation of semiarid regions, development of plantations of different ages, established with bare root and container seedlings. Conversion techniques of degraded oak forests. Afforestation in Gorubinci. Production of Paperpot seedlings and their use in Macedonia for afforestation of bare land and results obtained. Sightseeing in Skopje. Day 5: Afforested terrains along the route. Pelister National Park. Antique town of Stobi. Floristic, dendrologic, phytocenologic rewiews, relict and endemic species, glacial phenomena in alpine parts of the forests. Day 6: Afforestation of Gorica. Galicica National Park, geomorphological phenomena, relict flora and vegetation, Macedonian oak, ecosystem under permanent protection. Day 7: Mavrovo National Park, relict and endemic flora, Macedonian fir: distribution, ecology and biology, wildlife management, St. Jovan Bigorski Monastery.

Route 17. Forestation of semi-arid areas and natural parks in the south of Yugoslavia (Ljubljana –Skopje–Titov Veles–Bitola–Ohrid–Tetovo–Prizren–Pec–Rozaj–Mojkovac–Titograd–Cetinje–Dubrobnik) 7 days. (Leaders: J. Jevtic, B. Vukovic).

Day 1: Afforestation of rocky ground in semiarid conditions. Park-like forest on The Vodno Mountain – improvement of eroded soils by biological and technical means. Production of paper pot seedlings with protected roots in the Parks and Greens Nursery. Afforested area, information about work technology. St. Pantelejmon Monastery. Day 2: Afforestation of rocky ground in semiarid conditions. Archaeological site (Stobi). Pelister National Park with relict and endemic species. Goce Delcev forest. Day 3: Afforestation of rocky limestone ground on Mt. Gorica. Galicica National Park – Macedonian oak forest (*Quercus trojana-macedonica*) and information about Galicica mountain vegetation. St. Naum Monastery and its surroundings. Day 4: Mavrovo National Park, information about endemic, relict and rare flora and fauna. Management of virgin beech forests. St. Jovan Bigorski Monastery, its carved iconostasis, a masterpiece of local artists. Day 5: Transformation of coppice into high forest. Habitat of Bosnian pine (*Pinus heldreichii* Prist.) and Macedonian pine (*Pinus peuce* Gis.) of Sara mountain slopes. Old stand of planted black pine (*Pinus nigra* Arn.) in Decani (the oldest afforestation in Kosovo). Sightseeing: St. Ljeviska Church and Pasha's Mosque. Krusi wine cellar. Visoki Decani Monastery (the 14th century). Day 6: Information about forest environment, endemic and relict species in Rugovska Klisura. Natural fir and spruce forests in Saljani. Pecka Patrijarsija Monastery. Oriental aspects of Pec. Day 7: Biogradska Gora National Park and virgin forest. Forest cultural and artificial stands of Sub-Mediterranean conifers on arid Karst. Moraca Monastery. Cultural and historical monuments in Cetinje – old capital of the Principality and Kingdom of Montenegro.

Route 18. Forestry and mixed deciduous inland forests and the forestry of the sub-Mediterranean area (Ljubljana–Litija–Krsko–Cateske Toplice–Jastrebarsko–Zagreb–Plitvice–Gospic–Zadar–Islands of Kornati–Zadar–Split) 5 days. (Leaders: J. Gracan, S.Mestrovic, B. Kosir).

Day 1: Management of broadleaved forests of the Ljubljana Forest Enterprise. Sightseeing: Bogensperk Castle. Silvicultural planning. Tending of young stands, introduction of mechanized technology of timber skidding in younger stands. Tending of pole-stage forest. Comparison of tended and non-tended stands. Energy flow in managed forests. Day 2: Rich common oak sites – Reforestation of degraded stands. Introduction of conifers in high productive beech sites. Duro Salaj Pulp and Paper Mill. Kartuzija Pleterje Monastery. Common oak protected forest – research plot (rich common oak sites). Brezice Forest Enterprise in words and pictures – Exhibition in Kostanjevica. Introduction of conifers to high productive beech sites. Day 3: Forest Research Institute, Jastrebarsko. Karlovac Forest Enterprise. Tocak Exp. plot. Day 4: Cokova uvala beech virgin forest – Management in the Plitvicka jezera National park. Sight-seeing: Plitvice Lakes – a series of terraced lakes of the travertine origin. Day 5: Kornati Nat'l Park. Sight-seeing: islands and boat trip around Kornati.

Route 19. Transition from classical monoculture forestry to multipurpose forestry; harvesting in dying forests (Ljubljana–Slovenj Gradec–Radlje–Mislinja–Ljubljana–Trnovski Gozd–Nova Gorica–Ljubljana–Cerknica–Opatija, Rijeka–Delnice–Zagreb) 6 days. (Leaders: M. Hocevar, J. Lebez, M. Harapin).

Day 1: Tending-based forest management. Visiting a sculptor's workshop (Janko Dolence). Environmentally and economically sustained forest management. Aims of forest management: from maintenance to investments. Thinning and pruning related to the quality in a multifunctional forest. Timber production as integral part of forest tending. Forest regeneration based on natural regeneration and individual tree exploitation. Conceptual argumentation of forest management which is based on forest tending. Day 2: Indirect (gradual) conversion of spruce monocultures into a naturally managed forest. Modern forestry in the 19th century. Returning to naturally managed forest from monoculture and achievements. Exclusiveness to indirect conversion – thinning. Exclusiveness to indirect conversion – regeneration introduction of species. Day 3: A historic review of management in mixed forests of spruce, beech and silver fir. Processing of low-value timber of broad-leaved trees. Computer-controlled production lines, the Tolmin forest enterprise area. Temperature and vegetative inversion. History of Trnovski gold forest management planning. Silvicultural planning and silver fir dieback. Day 4: Forest management in areas with silver fir dieback and abundant herbivorous wildlife. Search for balance between forest and wildlife. Sightseeing of karst spots, Rakov Skocjan, Lake Cerknica, and Sneznik Castle. Silvicultural planning of silver fir in the Postojna forest enterprise area. Wood-processing plant in Stari trg. Mechanized storehouse for additional processing of coniferous wood. Interrelation between forestry&wildlife. Follow-up of forest vegetation development. Day 5: Wildlife and hunting management in Gorski Kotar and visit to the Risnjak National Park. Wildlife exhibition and art exhibition in Delnice. Risnjak National Park. Wildlife and hunting management in Gorski Kotar. Day 6: Management of beech, spruce and silver fir forests. Zalezina Training and Research Centre. Management of beech, silver fir and spruce selection forests. Radin Ravna Gora wood processing industry - final wood processing.

Route 20. Air pollution in forests (Ljubljana–Kamnik–Gornji Grad–Topolscica– Zerjav–Ravne–Slovenj Gradec–Dobrna–Celje–Trbovlje–Ljubljana) 4 days. (Leaders: M. Solar, D. Jure).

Day 1: Methods of estimating the die-back of forest in Slovenia (Solar, Smole). Aspects of ethnological interest in the Upper Savinja valley. Treasures of the Church of Sv. Francisek. Chemical analysis of total sulphur content of plant material – methods and results (Solar, Kalan). Bio-indication of polluted air based on epiphytic lichens (Batic). Diseases and pests in inventory of

die-back of forests. Sensitivity of Slovenia to die-back of forests (Zonta). Salek valley tertiary depression. Day 2: Large-scale classic emission, cytogenetic, meteorological and silvicultural research in areas of classic emissions. Large scale scorching in 1985. Cytogenetic research in the pollution radius of the Sostanj thermal power station. Emissions in Salek valley. Upper Meza valley. Forest management, ecological and social consequences of severe pollution in forests. Measures to address forest pollution near the state border. Adaptation of silvicultural measures to specific pollution conditions. Cytogenetic and morphological changes in the vegetation in the Meza valley. Ecological problems of lead smelting in Zerjav, improvement. Day 3: Amelioration of forests near towns. The UN art gallery, Slovenj Gradec and Celje Museum. Example of successful improvement of degraded forest. Emission and their chemical; composition in the Celje area. Regeneration of forests in the environment, affected with the pollution. Celje through the centuries. Day 4: Mining and Trbovlje thermal-electric power station, vegetation succession, results of inventory of die-back of forests. Bogen-Sperk Castle. Mining in Zasavje. Forest management and general characteristics of Zasavje pollution area. Vegetation succession after partial improvement of the air. Zasavje pollution problems today in the light of meteorological parameters and improvement measures. Inventory and evaluation of forest die-back.

All the members of the USSR delegation participated in Excursion/Route 3 (Harvesting and processing of high-value Slavonian oak – an integrated approach to silvicultural treatments). It is worth note that the group of 37 people included 12 people from Japan, 9 from the Soviet Union, 3 from each of China, Sweden and Yugoslavia, and 7 from other countries.

Particularly praiseworthy attributes of those scientific excursions to different forest areas of Yugoslavia were their excellent organisation, and friendliness and openness of the hosts and people. The Russian delegation unanimously noted the desirability and effectiveness of such events.

Soviet /Russian participation

The Soviet delegation was headed by Professor Nikolay A. Moiseev, Director, All-Union Research Institute of Silviculture and Forestry Mechanisation (VNIILM), and consisted of 23 people, registered for the Congress. It included representatives of the government agencies, fundamental and applied research institutes, universities: its composition was unusually representative and it was the largest Russian/Soviet delegation in the history of Russian/Soviet participation in IUFRO Congresses.

It included: L.E. Mikhailov, USSR State Forestry Committee; N. A. Moiseev, VNIILM; A.N. Oblivin and V. S. Shalaev, both from the Moscow Forest Engineering Institute; A.I. Pisarenko, Soyuzgiproleskhoz; P.I. Abol, TsNIIME; A.S. Isaev, L.N. Isaeva, Yu.N. Baranchikov, Leonid I. Milyutin, Lev Nedorezov, Valentin V. Protopopov, Nina E. Sudachkova, Boris S. Chudinov – all from the Institute of Forest, Siberian Branch, USSR Academy of Sciences, Krasnoyarsk; S.E. Vomperskiy, G.V. Lindeman and Galina A. Polyakova all from the Laboratory of Forest Sciences, USSR Academy of Sciences, Uspenskoye, Moscow Region; N.V. Starova, Botanical Garden, Ural Branch, USSR Academy of Sciences, Ufa; M.O. Daugavietis and I.K. Ievin both from the *Silava* Research and Operation Association, Salaspils/Riga, Latvian SSR; M. Kodar, Estonian Institute of Forestry and Nature Conservation, Tartu, Estonian SSR; Yu.Yu. Tunytsya, Lvov Forestry Institute, Lvov, Ukrainian SSR. L.A. Kayryukshtis who was a USSR citizen but worked in the International Institute for Applied Systems Analysis (IIASA)[238] in Laxenburg and was a member of the Austrian delegation. The direct participants of in the Congress were I.K. Ievin, A.S. Isaev, L.N. Isaeva, N.A. Moiseev, A.N. Oblivin, A.I. Pisarenko, V.S. Shalaev, Yu.Yu. Tunytsya, and S.E. Vomperskiy,

[238] The International Institute of Applied Systems Analysis – IIASA.

representing three groups: the Academy, applied forest research institutes, subordinated to the government's forest agency and universities – three persons form each group.

Soviet scientists and experts submitted 38 papers to the Congress – an unprecedented number in the history of the USSR/Russia participation in the previous Congresses. The list of the papers of Soviet scientists (including Russian) is presented below in the alphabetical order.

Invited and Voluntary Papers:

1. Abol, P.I. Wood harvest and its primary processing in the USSR;
2. Chudinov, B.S. Water in Wood: Problems, Achievements and Perspectives;
3. Gordiyenko, V.A. Helicopter Timber Logging;
4. Ievin, I.K., Daugavietis, M.O. Tree Croown Biomass as a Source of Biologically Active Substances and Energy;
5. Iroshnikov, A.I. Problems of genetics – breeding ensuring of plantational forestry programmes;
6. Kairiukstis, L.[239] – Integration of silviculture in regional development: some experience of Lithuania, USSR;
7. Kozhevnikov, A.M., Yefimenko, V.M., Davidenko, N.V., Davidenko, I.V. Silvicultural – economic programmes of service-felling in pure stands;
8. Moiseev, N.A. System Approach to Multiple Forest Use Management Strategy for Large Areas;
9. Moltschanowa, S.E. Schutzwalder bei der Steigerung der Produktivitat des landwirtschaftlichen Bodens der Aritzone;
10. Oblivin, A.N. Technologisches Verfahren der Spanplattenproduktion;
11. Pasternak, P.S., Voron, V.P. Forest Stands Resistance to the Industrial Air Pollution Influence in the Steppe and Forest Steppe Regions of Ukrainian SSR;
12. Petrov, S.A. The matters of gene resources revealing and preservation of main forest species;
13. Sannikov, S.N. Outline of cyclic erosional – pyrogenic theory of Common pine natural renewal;
14. Shalaev, V. Trends in intensifications of sawmilling;
15. Sudachkova, N.E. Xylogenesis of coniferous;
16. Sukhikh, V.I. Speceborne Remote Sensing as Applied in Soviet Forestry;
17. Tunytsja, J.J. Okologisch – okonomische Probleme der Forstwirtschaftsentwicklung;
18. Vompersky, S.E. Scientific fundamentals for draining peatlands and water-logged forests in the USSR.

Posters:

19. Baranchikov, Yu.N. Ecological Basis of Intraspecific Differentiation in Gypsy Moth;
20. Chudinov, B.S. Water in Wood: Problems, Achievements and Perspectives;
21. Golosova, M.A. The Role of Cytoplasmic Viruses in the Population Dynamic of Forest Insects;
22. Isaev, A.S. Population Dynamic of Monochamus Urussovi Fisch. In Coniferous Forests of Siberia;
23. Isaeva, L.N. Wood Moisture and Specific Gravity of the Main Forest Forming Species of Siberia;
24. Kairiukstis, L., Juodvalkis, A. How to model and form maximally productive stands;
25. Kovalev, A.G., Malkina, I.S. Development of Growth and Photosynthetik Patterns in Pine Needles;

[239] In that time, Dr. L. Kairiukstis was working in the IIASA (Laxenburg, Austria).

26. Lindeman, G.W. Highly-aggressive Xylophage Insects and their Role in the Forest;
27. Miljutin, L.I. Polymorphism of Larix sibirica and Larix gmelinii in the Contact Zone of their Areas;
28. Nedorezov, L.V. The Identification of the Structures of the Phase Portraits of the Forest Insects Number Dynamics with the Help of the Experimental Data;
29. Nikitin, V.P. Radical Reclamation of Ravined Agricultural Lands in the USSR;
30. Nikolaenko, V.T. Forests and Protection of Environment;
31. Nommsalu, F. Vielseitig orientierte Forstwirtschaft in der Estonischen SSR;
32. Oleksyn, J., Giertych, V., Ryedko, G.I.240 Productivity and Adaptability of European Scots Pine Populations;
33. Polyakova, G.A. Recreation Effects on Forest in Moscow District;
34. Protopopov, V.V. Forests of Siberia and Far East as Ecological Potential of the Country;
35. Rukosueva, N.P., Gukasyan, A.B. Biological Activity of Soil of Mountain in Siberia;
36. Starova, N.V. Individual Heterosis and Population Polymorphism in Forest Plant Breeding;
37. Sudachkova, N.E. Xylogenesis of coniferous;
38. Vaicys, M., Armolaitis K. Gas Resistance and Regeneration of Forests Damased by Industrial Emission.

In addition, V.S. Chudinov and N.S. Sudachkova presented their posters.

Interesting facts

At the time of the Congress, more than 10,000 scientists from 97 countries from all continents collaborated in IUFRO. The official languages were English, French and German, but Spanish was increasingly more often used. IUFRO steadily cooperated with a number of international organizations such as: FAO, UNESCO, UNDP, UNEP, IUCN, WWF, ICRAF, ICSU, ISTF, IUSF and others. At that time, the six Divisions included 40 subject groups, 23 project groups and about 250 working parties (Morandini 1986). For the first time in IUFRO history, students actively participated in the Congress (IUFRO 1986k).

The host country, the Socialist Federal Republic of Yugoslavia, united six republics – Slovenia, Croatia, Serbia, Macedonia, Bosnia and Herzegovina, Montenegro – and two autonomous provinces, Vojvodina and Kosovo. The Republic was populated by 22 million citizens in an area of 255,804 km^2. The forests covered 92,000 km^2. Private forestlands accounted for 30 % of forest land and the 70 % of forest land was in public ownership. Tree species composition was as follows: European beech – 48 %, fir and spruce – 23 %, oak – 13 %, pine – 5 % and other broad-leave species – 11% (Unasylva 1987).

[240] G.I.Ryedko co-authored this paper with his colleagues from Poland.

Chapter 24
Congress XIX – August 5-11, 1990, Montreal, Canada

This Chapter draws mainly from the documents of the 19th IUFRO World Congress, which were published by the Congress Organizing Committee (IUFRO 1990a-i) and information from the Congress participants (O'Loughlin 1990, Sesco and Whitmore 1991, Teissier du Cross 1991).

Overview

The 19th IUFRO World Congress had as its title: *Science in Forestry: IUFRO's Second Century*. It was attended by 2,006 delegates from 91 countries and nearly 500 accompanying persons (all in all, about 2,490 people). The agenda included 5 plenary meetings, 60 inter-divisional sessions, 36 side meetings, 880 technical sessions, 1,350 sessional papers, 370 posters, 35 commercial exhibitions, 25 cultural events, and 14 excursions (of 17 proposed tours).

Scientific program

The Congress began its work on August 5, 1990, by welcoming addresses of Frank Oberle, Minister of Forestry, Canada; Abe Lemonchik, Montreal City Councillor; Albert Cote, Quebec Minister Responsible for Forestry.

In his welcome address under the title: *Global Forestry Research: Closing of the First Century. Preparing for the Second*, IUFRO President Robert E. Buckman mentioned: "One hundred years ago next month, the founding members of the Union began discussions that led, two years later, to the creation of what is now the International Union of Forestry Research Organizations. From seven institutions in Central Europe at its founding in 1892 the Union has grown 100 fold, today representing 106 countries, nearly 700 research institutions and about 15,000 scientists. Compare the concerns of forestry research 100 years ago with those of today. The seven founding members sought to standardize the measurement of trees and to improve the comparability and interpretation of forestry research among the participating institutions - understandable and necessary concerns of that day. Over the years, appropriate methods have evolved to address scientific issues as both the Union and forestry have grown in size and complexity. Since our Congress in Ljubljana four years ago, about 200 conferences, symposia, and workshops have been sponsored or cosponsored by the 60 subject and project groups (and their many working parties) of the Union. The contents of these meetings address virtually all of the technical fields that surround forestry and forest products research. This 19th Congress will be the last of the first century of the Union. Its theme asks how and where the sciences of forestry will carry us as we enter our second century. We conclude this first century challenged by an increasingly complex world of forestry - a world more sensitive and demanding of forests for economic, social and environmental values than ever before".

President Buckman identified the most significant problems, facing the IUFRO community: "Air pollution and forest decline, so important in our Congress of four years ago, has enlarged to embrace interrelationships between global climate change and forests. These concerns, more than any other, emphasize the interdependence among all nations about global environments and the vital role that forests play; the growing realization that destruction of tropical forests threatens the

economic and environmental well-being of many people in developing regions of the world. This, for example, leads to a re-examination of the FAO-sponsored Tropical Forestry Action Plan. The intent of the International Agricultural Research System to include forestry research as part of its mandate. While many details remain to be resolved, this has profound scientific and financial implications for forestry research in the developing world. The rapid dissolution of barriers that heretofore made East/West cooperation in forestry research so difficult" (IUFRO 1990a, p.53).

It should be also briefly noted how President R. Buckman assessed the situation, reflecting, to some extent, the reality and direction of forest research which was confirmed by the heads of the G7 a month prior to the Congress in the *Houston Economic Declaration*. In this document, the Heads of the seven industrial nations identified the urgent need for a global forest convention or agreement "to curb deforestation, protect biodiversity, stimulate positive forestry actions, and address threats to the world's forests"[241], and several forestry and environmental issues, similar to those addressed at the IUFRO Congress. The speaker further pounted to the growing complexity and magnitude of problems to be faced now and in the future; and stressed: "We must reach out and adapt to forestry research the biological, social and physical technologies emerging in other disciplines. Equally important is building the capacity to conduct forestry research itself and the essential education and outreach programs that accompany science. It will be apparent to many of you that it is inevitable that the broader fields of endeavour will require new mechanisms for coordination and cooperation in global forestry research" (ibid., p.54).

In conclusion, President Buckman thanked the hosts and the participants who were concerned about the future well-being of the world's forests, and wished success in their work.

The Opening Ceremony included musical and visual presentations, showing beautiful landscapes and lifestyles in Canada.

At the Opening Ceremony, the following nine scientists received the IUFRO Scientific Achievement Awards (SAA): Dr. Rene L. Alfaro (Canada) for achievements in forest pest damage appraisal and impact assessment; Dr. Reinhart Ceulemans (Belgium) for the development of early physiological selection indices for poplar; Dr. David O. Lapido (Nigeria) for research to improve west African hardwoods; Dr. Ross E. McMurtrie (Australia) for extensive work on process-based models of forest growth; Dr. Jeffrey J. Morrell (USA) for his work on interaction between biological agents, causing deterioration of wood with the wood structure and chemicals therein, and effectiveness of preservative agents applied to wood; Dr. Jacek Oleksyn[242] (Poland) for his outstanding Scots pine provenance studies; Dr. Anthony Pizzi (South Africa) for the extensive work on adhesives and substantial contribution on chromium-based wood preservatives; Dr. Christian G. Sales (France) for the breadth of his contributions, ranging through analyses of the mechanics of standing trees, the stresses encountered in drying and structures and the dynamics of sawblades; and Dr. Melvin T. Tyree (USA) for his outstanding contributions to the understanding of both biophysical and physiological aspects of transport in plants over many years, invention and popularization of current pressure bomb theory, and development of a rigorous mathematical formulation for the flow of solutions through plants.

New IUFRO Honorary Members were elected: Marten Bol (Australia), Dusan Mlinsek (Yugoslavia), Ulf Sundberg (Sweden), and Richard Plochmann (USA).

The Distinguished Service Awards (DSA) winners of 1990 were Polona Komac Ambrozic and Mirko Vidakovic (both from Yugoslavia), Jan Materna (Czechoslovakia), Bryan Payne (USA), Lorne F. Riley and Oscar Sziklai (both from Canada).

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[241] Adopted at the G7 Summit on July 9–11, 1990 at Houston, USA. Partial citing of bullet point 67 (out of 84) of the Declaration. http://www.mofa.go.jp/policy/economy/summit/2000/past_summit/16/e16_a.html

[242] Dr. J. Oleksyn graduated from the Leningrad Forest Technical Academy (St.-Petersburg, USSR) in 1976.

Between the Congresses, the DSA was awarded to Syama P. Raychaudhuri from India (in 1989); Chris v. Kraayenoord from New Zealand, Helmuth Schmidt-Vogt from Germany and Stanley Gessel from the USA (in 1988), and Ryoichi Handa from Japan, Bertil Thunell from Sweden and Walter G. Kaumann from France (in 1987).

Each day from Monday to Friday began with a keynote address, followed by two sub-plenary sessions. The five keynote addresses were made by prominent specialists in their fields, administration or business. These keynote addresses highlighted the following themes:

- Monday, August 6, 1990, Dr. Kenneth Hare, Chancellor at Trent University, environmental specialist, geographer (Canada): *Canada, Forestry and the Environment*.
- Tuesday, August 7, 1990, Professor Jeffery Burley, Director, Oxford Forestry Institute, Oxford University (UK): *Achieving Excellence in Forestry Research*.
- Wednesday, August 8, 1990, Professor Otto T. Solbrig, Harvard University, USA: *The Biological Sciences in Sustainable Forestry*;
- Thursday, August 9, 1990, Professor Sanga Sabhasri, Permanent Secretary, Ministry of Science, Technology and Energy Royal Government of Thailand: *The Role of Social Sciences in Sustainable Development*; and,
- Friday, August 10, 1990, Mr. Jaakko Veikko Emanuel Pöyry, industrialist and the founder of a global consulting company[243] (Finland): *Forest Industry Trends, Technical Advances and Scientific Challenges in the Years Ahead*.

The sub-plenary sessions determined general scientific directions of the Congress and covered the following themes:

- Air Pollution and Forest Decline;
- Challenge of Air Pollution to Forest Sciences;
- Forest Research Issues in the Tropics;
- Natural Ecosystems, Biological Diversity and Deforestation;
- Contributions of Biotechnology to Forest Research;
- Environmental Sciences in the Service of Forestry;
- Science of Agroforestry;
- Forests for Industrial Requirements Including Energy – Assessment, Inventory and Supply;
- Physical Sciences and Engineering in the Service of Forestry;
- Social Forestry Research for Sustainable Development: Institutional and Human Resources.

At one of such sessions, Academician A.S. Isaev, Chairman the USSR State Forestry Committee, made a presentation about forests in the USSR, called: *Condition of the Forests in the USSR: Forest Policy Implications*, and, in particular, he said: "Mankind has entered into a hard period of looking for international strategy for ecological survival. Nowadays, none of the sound politicians, competent scientists or public leaders doubts that the future fate of mankind depends on the condition of the environment. The solution of the problem is intimately related to the conservation of the forest cover – a thin biosphere layer that, to a considerable degree, enables the stabilization of global natural processes. (…) It is known, that the conservation of natural landscapes is closely connected with the forest cover. It has been found that the stabilizing elements of a landscape (and forests are the first among them) must cover at least 1/3 of the area. That is why the existing forest cover (from 8 to 10 % of the whole surface of the Earth) is the allowable minimum, taken even in averaged figures.

The expected reduction of the forest cover will result in irreversible consequences unless the

[243] The founder of a global consulting and engineering firm focusing on the energy, forest industry and infrastructure and environment sectors – Pöyry (till 2006 – Jaakko Pöyry Oy).

process is stopped. The strategy of ecological survival, that has become a human problem, requires the development and implementation of a system of measures for forest cover conservation and improvement without any delay. We have already had sufficiently sad experience of underestimating the diversity of natural interrelations when realizing large projects. The unsustainable forest and water use in the river basins in the Central Asia has led to changes in the Aral Sea water area, irreversible in this century. Approximately 100 million ton of salt dust is blown by the wind over many hundreds of kilometres.

The negative complex effect on the ecological viability of the above region, caused by the vast areas of former bottom silt deposits, can, apparently, be assessed only in the nearest decades. However, it has already become clear, that the large region has turned into a zone of geological disaster. A large-scale national programme for the Aral salvation (including afforestation on the drained bottom and adjacent areas), that is under implementation now, requires considerable effort and its appreciable results may be expected inly in the remote future. As a result of too heavy and uncontrolled cattle grazing, hundreds of thousands hectares of ranges on slopes are degrading, the forest cover of the Middle Ada is diminishing catastrophically" (IUFRO 1990, vol. B, pp.164-165).

The speaker also focused on the ways to address this and other problems, in particular, through creating expertise systems and databases, on the need for a comprehensive assessment of the territory associated with the nature specific situation, on how to improve the monitoring of a territory, elaboration of the necessary forestry activities, as well as on the role of government and national forest policy in addressing the needs.

A particular attention was paid to forest radioecology: "The elimination of the consequences of the Chernobyl accident, which resulted in the contamination of the forests in the Ukraine. Belorussia and Russia with radionuclides on an area of more than 3 million ha, has become a state programme. Forest management on the polluted territories requires solution of many scientific, social and technical problems, as the conventional methods of forestry are not acceptable under these conditions. A regime of forest management is now being worked out intensively to provide safe conditions for people, conservation, neutralization and further functioning of polluted ecological complexes. The forests, contaminated with radionuclides outside the 30-km zone around the nuclear power plant, are still further divided into three subzones. At the level of contamination with caesium 137 and 134 higher than 40 curie per km^2 all forest operations are prohibited; strict limitations are introduced for the major part of operations at 15 to 40 curie/km^2, at less than 15 curie/km^2 limitations are established for the use of forest non-timber products. Radiometric mapping of the area has been made and is used as the basis for forest management there. The most severe danger, as regards the further pollution distribution, are forest fires and the resulting transfer of radionuclides outside the polluted zone" (ibid., pp.167-168).

Much attention is paid to the problems of Lake Baikal – a unique water body; to forest logging at the treeline in the Northwest region of the country. The latter issue was of great interest for the international research community, not only in terms of forest biology, but also in view of climate change and its impact on biocenosis dynamics in the northern forests.[244]

The speaker also talked about forest legislation as a tool to address these challenges. He said that forestry was acting on behalf of the state as the forest owner, and representatives of timber industry (companies, associations, corporations, etc.) acted as users who supplied forest products. In their work, they should strictly follow the requirements and environmental rules of the forest legislation and be controlled by the national forest service.

[244] Academician A.S. Isaev was a think tank, generating ideas of international approaches to this problem. After the Congress in Montreal, a conference was held in Arkhangelsk, which resulted into the establishment of a new international organization – International Boreal Forest Research Association (IBFRA) in 1991.

Academician Isaev identified the five basic principles of successful solutions of the problems: (i) forest and society interaction should have a scientific basis; (ii) forest management should take into account regional, natural and social specifics; (iii) forest logging and reforestation should be considered as synonyms, and should follow the principle of continuity and sustainability of forest management; (iv) sustainable forestry could not be subordinated to the user - forest industries - because the forester and the forest user had different philosophies as well as different time and ethical orientation; the forest needed only one owner and this owner could be only the forester who managed the forest on behalf of society and state; users should buy or rent the forests; it was foresters who were responsible for forest policy implementation and oversight; (v) the fast changing situation, forest decline on vast areas and the necessity to take urgent environmental protection measures, predetermined the primary role of monitoring, i.e., systematic follow-up of the condition of forest land and forest biocenosis. The planetary effect of the forest of any country necessitated systemic forest monitoring (ibid., pp.171-172).

It should be noted that Academician A.S. Isaev remains so far the only Head of the USSR/Russia Forest Service who participated also in the meeting of the IUFRO Enlarged Executive Board. It should be underlined that the IUFRO structure became more complicated because of the increased number of the Divisions, Subject Groups and Working Parties. "The 19th World Congress offered sessions in all areas of forestry research and particularly addressed the meeting's themes of air pollution and tropical deforestation. The 1986 Congress in Ljubljana recognized these problems, and IUFRO responded through special programs. Air pollution and deforestation continue to be major issues, and there has been a dramatic increase in concern for the sustainability of forests, the role of forestry in socioeconomic development, the effect of global warming on forests, the effect of forests on global warming, and the status of forests amid changes in land uses. Globally, the capacity for forestry research has not kept pace with the growing magnitude of the problems. In many developing countries it has actually declined. Forest science becomes even larger and more complex as forestry is understood to link to agriculture, the environment, and sustainable economic development" (Sesco and Whitmore 1991).

During the Congress, Division 1 *Forest Environment and Silviculture* had two sub-plenary sessions, 18 technical sessions of SGs, PGs and WPs and several business meetings of the Division and Research Groups, and one joint meeting of S1.05-05 Thinning and spacing experiments and S1.05-03 Treatment of young stands. The divisional meeting was held under the theme: *Merging ecosystem and modern plantation forestry*. Division 1 prepared two volumes of the Congress Proceedings, containing 79 invited papers, 94 voluntary papers and 65 poster abstracts. The total number of pages was 1,065 (IUFRO 1990c, d).

Division 2 *Forest Plants and Forest Protection* had one sub-plenary session, 21 technical sessions, four business meetings and one inter-Divisional meeting on air pollution. Division 2 prepared a volume of papers and posters (IUFRO 1990e).

Division 3 *Forest Operations and Techniques* had 15 technical sessions to discuss about 90 papers and 30 posters. The presentations dealt with the themes of its Subject Groups and other units:

- S3.01: Mechanical aspects of forest operations and centralized processing in Asia, Europe, and North America;
- S3.02: Research needs in stand establishment and treatment operations; nursery production in temperate and tropical regions; stand establishment and treatment in temperate North America;
- S3.04: Operational planning and control, work study; payment, labour productivity;
- S3.05: Tropical forest operations, economics, protection of social and environment values;
- S3.06: Forest operations under mountainous conditions; and the Project Groups:
- P3.01: Problems and perspectives of forest biomass energy;

- P3.03: Ergonomics;
- P3.04: Economical aspects of small-scale forestry, technical aspects of farm forestry, political aspects in (1) cooperative private forestry, (2) cooperative farmer forestry, (3) problems of timber selling;
- P3.05: Utilization of tree foliage.

Division 3 prepared a volume of papers and posters (IUFRO 1990f). In addition, Subject Group S3.04 was going to publish its Post-Congress Proceedings, containing about 30 papers on operational planning, control, payment and labour productivity (Corcoran, Linehamand and Liu 1991).

Division 4 *Planning, Economics, Growth and Yield, Management and Policy* had meetings of the following Subject Groups and Project Groups (122 invited papers mentioned):

- S4.0l Research Frontiers in Forest Mensuration, Growth and Yield/Research Progress in Forest Mensuration, Growth and Yield (14 invited papers).
- S4.0l/S4.02 Inventory, Monitoring, Growth and Yield Relationships (4)
- S4.01-03 Design, Performance and Evaluation of Experiments (4)
- S4.02 Research Progress in Inventory and Monitoring/ Future Resource Inventory and Monitoring Techniques/ Forest Inventory, Growth and Yield (15)
- S4.04 Forest Management Planning and Managerial Economies (25)
- S4.07-01 Forestry and Rural Development in Developing Countries (4)
- S4.07-03/S4.08-04 Forestry in Sustainable Economic Development (5)
- S4.07-04/S6.01 Conceptual Advances in Multiple-Use Forestry Evaluations (3)
- S4.07-05 Economic Evaluation of Forest Damages (6)
- S4.07-06 Supply and Demand of Roundwood and Forest Industry Products (8)
- S4.07/P4.11 Supply and Demand of Roundwood and Forest Industry Products (6)
- S4.07-07 Forestry and Rural Development in Industrialized Countries (9)
- S4.08-01 Analysis and Evaluation of Forest Policies (3)
- S4.08-02 Forest Institutions and Organizations: Trends in Structure and Administration (2)
- P4.02 Biological and Economical Considerations when Harvesting Young Stands (5)
- P4.11 Applied Sector Modelling (4)
- P4.11/S4.08 Structural Changes of the Forest Sector in a Global Perspective – Challenges for Forest Sector Analysis and Forest Policy (5 invited papers) and numerous voluntary papers and posters.

Division 4 prepared a volume of Proceedings (IUFRO 1990g) and one Subject Group S4.04 was going to prepare its own Proceedings (Klemperer 1991), which included 21 papers, and some of them were included in the Congress Proceedings only in the format of abstracts (IUFRO 1990g).

The *Working Party on Planning and Policy* discussed 2 papers on Aldo Leopold's Land Ethic in application to the national forest planning (A.G. MacQuillan, USA) and political economy of timber production (D.L. Schweitzer and H.J. Cortner, USA). The author of the first paper compared the "utilitarian ethics" of Gifford Pinchot, founder of the USDA Forest Service, and the "Land Ethics" of Aldo Leopold. Thus, it was a dispute between forest management and forest preservation, both of which had strong supporters. While both could coexist, serious conflicts were not always avoidable, e.g., protection of "spotted owls and huge trees" (up to 500 years and more old) would need much longer rotations for wood production, and hence, would reduce timber cuts and jobs. Although the experience of Britain of the 1960s showed that when the government closed many coalmines due to changed economic and environmental conditions, it built new towns complete with new industries. Underlying the role of government in the design and implementation of long-term strategies of national development, the author concluded: "Government must permit structural change to occur when it is in the larger public interest, and, they further imply that socially conscious

forest planning must take people into account and plan for change in a way that minimizes the suffering of those whose livelihood is to be adversely affected" (ibid., p.7).

The second paper organically followed the first one and depicted the political economy approach to timber production under the growing political pressure, calling for more economically efficient planning, management and use of forest resources via political and technical evolution of economic and institutional factors.

The *Working Party on Mathematical Programming and Planning* received 4 papers about management and yield regulation (Zh. Yu, Y. Zheng and T. Song, China), resource allocation concepts, based on the spreadsheet model for sustainable management planning (H. Yusuf, Malaysia) and optimum management strategies (J.P. Dwyer and W.B. Kurtz, USA). To follow the mainstream of the strategic approach to forest management and planning, M. Amano demonstrated a resource allocation model for multi-purpose management in Japanese national forests. Analysing the forest policy, the author compared sustainable timber yield in the past with new trends in public opinion when people insisted on the delay or cancellation of forest plans and projects when they were apprehensive of the ecological, visual and social welfare effects of such forestry activities (ibid., p.36). The study showed that people considered forests to be a means for erosion control, water resource conservation, wildlife habitat, etc. Timber production was on the fifth place in the survey. Thus, Japan was steadily decreasing its own timber cuts, expanding timber imports from other countries and enhancing reforestation and nature conservation programs.

The *Working Party on Management Issues and Forestry Investment Analysis* discussed 4 papers, addressing forest economic problems (B. Keresztesi, Hungary), estimating timber value growth rates (D.A. Ganser, S.L. Amer, and T.W. Birch, USA), evaluating forestry land (E. Uys, Republic of South Africa), and assessing the forestry investment potential on the island of Arran in Scotland (D.C. MacMillan, UK).

The *Working Party on Harvest Scheduling and Related Topics* discussed 11 papers, of which 6 papers were about modelling of timber growth and potential for timber harvesting in the context of sustainable timber use as a tool for forest planning and management – dynamic transition model (H.A. Jöbstl, Austria), simulation model (A. Priesol, Czechoslovakia), optimal control theory (E.A. Steinkamp and D.R. Betters, USA), computerized system (Jong-Cheon Choi, Republic of Korea), indicator increment method (M. Ianculescu, Romania) and determination model for the allowable cut (F. Carcea and I. Seceleanu, Romania). These papers demonstrated different approaches to modelling with the use of computer systems and programming (FORTRAN, Lotus, linear programming), forest inventory data, application and adjustments of the Faustmann formula, etc.

Professor Douglas C. MacMillan assessed the forestry investment potential and analysed factors, influencing forestry investment, such as physical potential (growth rate), financial appraisal (internal rate of return), land availability and planting grants (legal constraints for land modification, withholding grant payment, etc.), investment demand, e.g., "the ability of the potential investor to bid a higher price for the land than other competing users such as agriculture or sport" (ibid., p.88), to take into consideration the rate of return, potential tax relief, etc. According to the study, large scale afforestation was difficult in many areas of Scotland due to environmental and agricultural restrictions; increased grants would, on the other hand, increase new planting among farmers and traditional estates with spare land available. The decision to make an investment in forestry is often based on a complex range of factors which could be unrelated to crop performance and were often site-specific in nature (ibid., p.92).

Other papers were highlighted error sources and propagation in decision support systems (H.T. Mowrer, USA), rotation age studies (G. Montera, A. Rojo, and R. Alia, Spain), semi-quantitative evaluation of multiple-use forest stands (B. Van der Aa and B. Meulman, Belgium) and sustain-

able timber production (Wan Razali Wan Mohd, Malaysia). One more paper was about revenue systems, rent capture and logging behaviour in Malaysia, it was presented by an international team, consisting of J.R. Vincent and Awang Noor Abd (USA), and H.Yusuf (Malaysia).

H.T. Morer analysed decision support systems as an integration of such tools as simulation models (growth and yield), artificial intelligence (Bayesian belief network), geographic information systems (numerous sources of errors due to complexity of the system), and optimization algorithms (fuzzy linear programming) through the prism of potential errors, their sources, and awareness of the user about their existence and influence on the final result. Among other conclusions, the author noted with humour: "This error analysis is itself subject to error" (ibid., p.130).

It should be mentioned that this Congress initiated the development of international guidelines for forest monitoring by scientists from 20 countries (Päivinen et al., 1994).

Division 5 *Forest Products* registered 220 delegates, had technical sessions and business meetings with 160 papers and 90 posters presented, and prepared a volume of Proceedings (IUFRO 1990f). A substantial part of its papers were devoted to timber quality management. Three satellite meetings were held jointly with the International Association of Wood Anatomists (IAWA), closely relating to the work of S5.01; with the International Academy of Wood Science (IAWS), and the United Nations Industrial Development Organization (UNIDO). Twenty four representatives from 20 countries attended the meetings with the UNIDO and proposed to join efforts of IUFRO SPDC and UNIDO to establish a pilot program to link and enhance cooperation between forest products research institutions in developing and developed countries. The Forest Engineering Research Institute of Canada (FERIC) offered to be a clearing house, and the Forest Products Laboratory at Madison, Wisconsin (USA) agreed to assist in this endeavour.

Division 6 *Social, Economic, Information, and Policy Sciences* (former name: *General Subjects*) had meetings in each of its research or project unit though much fewer posters were submitted than promised. This Division would be in full operational status from 1991, although, some achievements were reported, with the major one of them being the publication of the new Forest Decimal Classification prepared by Project Group P6.01, in 1990. Subject Group S6.02 held a meeting on Statistics and Forest Inventory (Birmensdorf, Switzerland, May 13-15, 1990).

Thus, after the long work on the terminology and classification of forestry publications, the *Vocabulary of Forest Management* was published in 1990: it included more than 1,800 technical terms in 6 languages – English, German, French, Italian, Spanish and Russian. This dictionary was meant for foresters, scientists and students, interested in forestry (Unasylva 1991). This multilingual vocabulary (Schmid-Haas 1990) was the first publication in the IUFRO-launched *World Series*.

The IUFRO SPDC reported about its achievements for the past few years. The Report was presented and distributed among the Congress participants. During 1987-1990, the SPDC had been working towards enhancing efforts in the following seven major areas:

- Forestry research planning by holding workshops in Huaras, Peru, in summer 1987, on the role of multipurpose tree species in the life of rural communities in tropical Latin America (supported by USAID), Lilongwe, Malawi, October 1988, on the miombo and savanna woodlands ecoregion of East-Central and Southern Africa, (WB, CIDA and IDRC); Abidjan, Cote D'Ivoire, November 1989 on Forest Products (USAID and partially – Government of France);
- Training in forestry research management – training workshop for representatives of 21 sub-Saharan countries in Nairobi, Kenya, June 1989 (USAID);
- Training in forestry research methods – training course on statistical methods for forestry research from mid-September to the end of October 1987 at Gmunden, Austria (FAO, Oxford Forestry Institute);

- Improvement of information flows to developing countries – CAB International allowed SPDC to select material for the CAB series (Forestry Abstracts, Forest Product Abstracts, and Agroforestry Abstracts) from which eight cut-and-paste bulletins were prepared and sent out to over 600 forest research workers in developing countries. Another activity in this regard was a development of databases on donor agencies, sources of free or subsidized literature, and contacts of consultants with experience in developing countries;
- Fostering twinning arrangements. This activity did not have much progress due to lack of human capacity in the Programme;
- International Fund for Forestry Research Training – UNDP provided some funds for a few forestry scientists;
- The 19th IUFRO World Congress Montreal 1990 – panel discussion on Forest Research Issues in the Tropics.

The Closing Ceremony was held on Saturday, August 11, 1990. All delegates had a chance to contribute to the draft Congress Declaration that was disseminated prior to the session. The Declarations stated IUFRO's position on forest issues of global importance and gave a direction for the next 5 year of IUFRO development till the next Congress.

Organizational matters

It should be noted that in 1990, the IUFRO structure changed. It was the fifth reorganization of the Union. The Union rearranged its Subject and Project Groups and formed a major new unit – Division 6 dealing with forest policy and social issues by splitting Division 4. Thus, the work of the Congress was organized in line with these six directions, and the Congress Proceedings were published in 9 volumes: 2 volumes, containing the report and 7 volumes with the Proceedings of the 6 Divisions, including two volumes of the Proceedings of Division 1 (IUFRO 1990a-i). The Proceedings included invited papers, summaries of voluntary papers and poster abstracts. The Proceedings as a complimentary set of seven volumes were given to each IUFRO member institution, and the two-volume Congress Report (volumes "A" and "B") was disseminated later.

Task Forces (TF) were introduced as a problem-oriented instrument for a definite period of time. "IUFRO Task Forces are established on a temporary basis during each 5-year IUFRO Board term to advance inter-disciplinary cooperation in forest research fields that span two or more IUFRO Divisions. Their focus is on emerging key issues that are of great interest to policy makers and groups inside and outside the forest sector, and contribute to international processes and activities. Since 1991, over 30 IUFRO Task Forces have brought together scientists, policy-makers and other stakeholders to conduct innovative work across a broad range of topics" (for more information on these earlier Task Forces please visit: http://www.iufro.org/science/task-forces/former-task-forces/). During the Congress, the first Report from the *Task Force on Air Pollution – Forest Decline* was presented. This TF was established in 1985 being the first interdisciplinary group of IUFRO. At the Congress, the mandate of the TF was discussed and extended in a new *TF on Forest, Climate Change and Air Pollution* that was fully constituted in 1991 (Kräuchi 1995).

The International Council adopted Spanish as the fourth official language of IUFRO, alongside with German, French and English. These changes led to the revision of the IUFRO Statutes and Internal Regulations (1990).

Twenty four new Coordinators and their Deputies were appointed for the 6 IUFRO Divisions, and 9 new regional representatives were included in the IUFRO Executive Committee.

For the first time in IUFRO history, the new President was elected was from the Asian continent – Dr. Tan Sri Salleh Mohd. Nor (1991-1995), Director General, Forest Research Institute, Malaysia.

The novelty of this Congress was its decision to have two Vice-Presidents, and these positions were filled by Jeffery Burley (Great Britain) as Vice President (Programme) and James H.Cayford (Canada) as Vice President (Administration). This new position of the Vice President (Administration) was necessary in view of the increasingly complex activities of the Union such as finance, membership, secretariat, publications, etc.

The newly elected IUFRO Executive Board included: Past President Robert E. Buckman, Oregon State University, USA; Treasurer Franz Schmithüsen, Switzerland; Secretary Heinrich Schmutzenhofer, Austria; Division Coordinators: D1 – Jacob Les Whitmore, USDA Forest Service, USA; D2 – Howard B. Kriebel, Ohio State University, USA; D3 – Per Olov Nilsson, Swedish University of Agricultural Sciences, Sweden; D4 – Axel Roeder, Forestry Research Institute, Rheinland-Platz, Germany; D5 – Amantino de Freitas, Coordinator, Forest Products, Textiles and Leather Divisions IPT/SA, Brazil; and D6 – Harold Fred Kaiser, USDA Forest Service, USA.

The members of the Executive Board, representing the nine Regions were: Northern Europe – Roger Bradley (Great Britain); Central Europe – J. Van den Bos (the Netherlands); Eastern Europe – Andras Winkler (Hungary); the Mediterranean – Alejandro Lopez de Roma (Spain); Africa – Eduardo Bonkoungou (Burkina Faso); Asia – Hong Jusheng (People's Republic of China); Western Pacific – Marcia J. Lambert (Australia)[245]; North America – Jerry Sesco (USA); South America – Roland Peters (Chile).

Besides, the EB included the following IUFRO President Appointees (Nominees): Pentti Hakkila (Finaland), Satohiko Sasaki (Japan), Vladimir S. Chuenkov[246], and observers: Dr. Hollis Murray (Italy) from the FAO and the Leader of the IUFRO Task Force on air pollution and climate change – Dr. Rodolphe Schlaepfer (Switzerland).

President R. Buckman announced the composition of the IUFRO Enlarged Executive Board, which included representatives from Australia, Austria, Brazil, Burkina-Faso, Canada, Chile, China, Costa Rica, Denmark, East Germany, Finland, France, Germany, Great Britain, Hungary, Japan, Italy, Malaysia, Mexico, Poland, Switzerland, the USSR, and USA (IUFRO 1990a, pp.103-104).

Nikolay A. Moiseev (VNIILM) was elected representative of the USSR in the IUFRO International Council for 1991-1995, and Vladislav A. Alekseev (Sukachev Forest Institute of the Siberian Branch, RAS) was elected his alternate.

The Congress also re-affirmed the non-governmental and non-political nature of IUFRO, adopting principles of the International Council of Scientific Unions (ICSU).

Social events and activities for accompanied persons were organized during the Congress. In conjunction with the Congress, there were many commercial exhibitions of wooden grafts and arts, including of those of the Canadian First Nations as well as books, periodicals, paintings, posters, photographs and other items.

IUFRO SPDC supported about 90 research workers from developing countries to enable them to attend the Congress, and the Congress was one of the highest level IUFRO Congresses in its history. This became possible owing to the financial support from many donor agencies, including the Canadian International Development Agency (CIDA/ACDI), the USDA Forest Service, the Rockefeller Foundation and others. About 50 scientists were supported directly by the FAO, Canadian International Research Development Centre (IDRC/CRDI), CIDA, and German Society for Technical Cooperation (GTZ)[247].

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[245] The first lady elected to the IUFRO Executive Board.

[246] Later, A.P. Petrov replaced in the EB V.S. Chuenkov, who became the Deputy Coordinator of Division 4.

[247] Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). Now, it is the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH or shortly – GIZ (German Corporation for International Cooperation).

Resolutions

Declaration
IUFRO XIX World Congress (5-11 August 1990, Montreal, Canada)

Considerations: As the International Union of Forestry Research Organizations approaches its 100th anniversary, the importance of the world's forests and trees to humankind is dramatically increasing. Forests are essential to the economic, social and environmental well-being of all citizens of the world. Forests and trees contribute to the conserving of soil and water resources; to an essential supporting role for agriculture; to ameliorating local and global climates; to providing carbon sinks important to intervention strategies in global climate change; to enhancing urban and rural aesthetics; to serving recreational and spiritual requirements; to meeting food, fuelwood, fibre and medicinal needs of people; to international trade of important materials; and to sustaining ecosystems essential to strategies for maintaining biological diversity thereby providing a legacy for future generations.

The 1986 IUFRO Congress in Ljubljana recognized the problems of air pollution and tropical deforestation. IUFRO responded through special programmes. Air pollution and deforestation continue to be major issues. Since then, there has been a dramatic increase in concerns for the sustainability of forests, the role of forestry in socio-economic development, the impacts of global warming on forests, the effects of forests on global warming and the status of forests among changes in land uses.

These concerns over the use, management and protection of forests, their productivity and their many values lead to an unprecedented urgency for developing and applying new professional and scientific knowledge. Interactions among such pervasive issues as global climate change and air quality, on the one hand, and temperate and tropical forests of the world, on the other, are inadequately understood. Increased knowledge of both the biological and physical aspects of forests as well as socio-economic, policy and cultural dimensions are essential.

Forest science and the forestry research institutions are central to resolving the complex issues facing forestry. Globally, the capacity for forestry research has not kept pace with the growing magnitude of the problems. In many developing countries it has actually declined.

Forest science becomes even larger and more complex as forestry links to agriculture, the environment and sustainable economic development. Science will focus increasingly on tropical forests. Especially important is the need to coordinate the numerous forestry research activities among developing countries and to increase cooperation with ongoing programmes in agriculture. The expanding task now recognized for the conservation and management of forests brings great urgency to the work of IUFRO and world forest science.

Recommendations: Governments, international development agencies and forestry research organizations are encouraged to foster international cooperation and coordination of research programme needs identified in the Tropical Forestry Action Plan. Accordingly, IUFRO should strengthen linkages for the Special Programme for Developing Countries (SPDC) with other international organizations, especially the Consultative Group for International Agricultural Research (CGIAR), the Food and Agricultural Organization (FAO), the International Council for Research in Agroforestry (ICRAF) and the International Tropical Timber Organization (ITTO). Though programmes of SPDC should take closely into account the work of these and other organizations, the SPDC's method of operation should be proactive and emphasize its comparative advantages.

IUFRO, recognizing the implications of air pollution and of global climate change, should encourage initiation, expansion and redirection of basic and applied research concerning the role of forests. Forestry research organizations in both temperate and tropical countries as well as in the Mediterranean region should strengthen or initiate programmes studying the effects of air pollution on forest ecosystems and expand research on the relationships of global climate change to trees and forests. IUFRO's special task force on air pollution should expand its scope

accordingly. It recommends a vigorous programme of monitoring forest ecosystems for the long term, using standardized proven methods. As a worldwide, non-governmental organization IUFRO must play a leading role in helping to implement an international, integrated approach. In addition, studies of socio-economic implications and policy options need to be considered.

IUFRO urges that the building, strengthening and maintaining of institutions for forestry research, education of new scientists and the continuing education of present scientists receive urgent attention. Development of future forest scientists and an increased capacity to conduct research, especially in developing countries, is crucial. IUFRO's special role in nurturing and extending the efforts of forest scientists through activities of its divisions and the SPDC will be encouraged and expanded.

The international forest science community is obligated to inform others of scientific findings and their implications for forest practice as well as to inform public opinion in the debate on forestry issues, globally and locally. Existing and new scientific findings must be made available in more effective ways, especially within the developing countries and between scientists of developed and developing countries. IUFRO's divisions, programmes and task forces have a particular role in addressing this need. IUFRO encourages forestry scientists to participate in and support the decision process in forestry issues.

To achieve these essential objectives, funding for forestry research must be expanded substantially. Governments, international agencies, donors and others supporting research programmes are encouraged to take a long-term view of the growing global concerns about the sustainability of forests in meeting the environmental, economic and social needs of people. To do so will result in a strengthened commitment and support for forest sciences. Although the need exists at all levels, particularly crucial are forestry research programmes for developing countries.

Excursions

In the afternoon of Wednesday, August 8, 1990, nine in-Congress tours to different forest-related enterprises were offered. The post-Congress excursion program was very rich and offered 17 routes, with 14 of them (in Canada and to the Northern USA) chosen by 500 participants:

1. Cancelled
2. General Forestry in the boreal Forest Region;
3. Forestry in the Hardwood-Mixed-wood Region;
4. General Forestry in the Pacific Northwest;
5. General Forestry in Rocky Mountain Forests of Alberta;
6. The Far North: Yukon and Alaska;
7. Forest Pests, Declines, and Pollution Damages;
8. Biotechnology;
9. Tree Improvement/Genetics/Nurseries;
10. Forest Harvesting and Operations;
11. Cancelled
12. Forest Management Systems;
13. Forest Products;
14. Cancelled
15. Parks, Recreation, and Urban Forestry;
16. Land Use Impacts;
17. Forest Hydrology and Watershed Management.

Due to a number of circumstances, three routes (1, 11, and 14th) were cancelled. Among the Soviet delegates, only I.K. Ievin and D.V. Mozhaev participated in the post-Congress tours, in particular, in Route 2 General Forestry in the Boreal Forest Region:

“Undoubtedly the most striking aspect of the Boreal Forest Region is its immense size, stretching continuously from Newfoundland to Alaska. Over 6 000 km in length and averaging close to 1,000 km in width, it represents approximately 80% of Canada's forested area. The northern sector is a transition zone approaching the tree line, and the southern belt is characterized by commercial forests. Our visit was confined to the south-central portion of the forested zone, an area dominated by white and black spruces (*Picea glauca* and *P. manana*), tamarack or eastern larch (*Larix laricina*), jack pine (*Pinus Banksiana*), white birch (Betula papyrifera) and poplars (*Populus tremuloides* and *P. balsamifera*), much of it classified as the Northern Clay Section and known simply as the "Clay Belt". Occupying gentle, northward slopes, this section is underlain by widespread surface deposits of lacustrine materials and by a nearly level topography, all inherited from a glacial lake known as Lake Ojibway[248].

An impressive characteristic of the Clay Belt is the seemingly endless stretches of stands of black spruce, which cover both gently rising uplands and lowland flats. Drier sites, such as outwash deposits, old beaches, and eskers, are dominated by jack pine. Between Hudson Bay and the Great Lakes lies a section of boreal forest of intermediate nature. It is essentially a Boreal Forest Region, but it does contain certain species from the adjoining Great Lakes-St. Lawrence Forest Region. The topography, as one may expect, is more rolling. Only about two days of the tour were spent in the Boreal Forest Region itself. However, while traveling northward into and southward out of the Region, we had a unique opportunity to observe many of the geographical features and land use impacts which have had such a profound effect upon Canada's development. There is, on the one hand, the sparsely settled Boreal Region, dependent upon forestry, mining, and tourism activities.

At the other extreme lie Montreal and Toronto, Canada's two largest centres of financial and industrial activity, and situated in an area encompassing the majority of the nation's population. It is also an area of gentle topography, more fertile lands, and one dominated by deciduous species such as sugar maple (*Acer saccharum*) and yellow birch (*Betula lutea*). In between lies a picturesque transition zone characterized by the rugged topography of the Precambrian Shield, many lakes, and a mixed-wood forest once dominated by white pine (*Pinus strobus*), the mainstay of our earlier lumbering industry.

Today, forest operations for both softwood and hardwood species remain an important land use, together with a rapidly growing demand for recreation from nearby urban centres. Resolving the resulting land-use conflicts is a major political issue. We looked at several aspects of the Boreal Forest Region and adjacent areas: its many forestry and forest-related operations, mining activities, and rural development. In addition, there were opportunities to talk with many interesting people from this colourful mosaic called Canada. After six days and 2400 km, we had a better appreciation of the immensity of this country, its tremendous geographical and settlement variation, as well as the hopes and dreams for forest management. To complete our sojourn, we wrapped things up on a “high” with dinner at the CN Tower in Toronto, the world’s tallest freestanding structure” (IUFRO 1990a. p.577).

Soviet/Russian participation

The official delegation of the Soviet Union consisted of 15 people. It was headed by Academician Alexander S. Isaev, Chairman of USSR State Forestry Committee and included

[248] The Lake Superior is a part of the system of the five Great Lakes on the border of Canada and the United States. Ojibwe, also known as Chippewa or Anishinaabe is one of the largest and most widespread groups of indigenous peoples (First Nations) in North America. “Ojibwe Country primarily extends from Quebec, across Ontario and Manitoba to Saskatchewan in Canada, and from Michigan, Wisconsin, Minnesota and North Dakota in the United States”. The Ojibwe People's Dictionary; University, Michigan, USA; http://ojibwe.lib.umn.edu/ Accessed on 07/14/2014.

representatives from government agencies, universities, academic and forest sector institutions: Stanislav G. Sinitsyn, Nadezhda N. Larionova (USSR State Forestry Committee), Dmitry V. Mozhaev (TSNIIME); Nikolay A. Moiseev (VNIILM); Alexander N. Oblivin and Valentin S. Shalaev (Moscow Forest Engineering Institute); Anatoly P. Petrov (VIPKLH); Yuri N. Baranchikov (Sukachev Institute of Forest, Siberian Branch, the USSR Academy of Sciences); Mikhail V. Kozlov (Research Institute of Plant Protection, Leningrad); Andrei S. Pleshanov (Siberian Institute of Plantation Physiology and Biochemistry, Irkutsk); Valdeko J. Land (Tallinn Polytechnic Institute, Estonia); Thomas E.A. Frey (University of Tartu, Estonia), Leonardas A. Kayryukshtis (Lithuanian Forest Research Institute, Vilnius); Imant K. Ievin (*Silava* Research and Operation Association, Salaspils/Riga). The USSR participants submitted 45 papers to the Congress:

1. Baiburina, R.K.; Ermakov, V.I. Clonal micro propagation of the forest woody plants in vitro;
2. Baranov, A.Y. Early prognosis of the Lepidopteran forest pest's outbreak transgenerational pathogen transmission;
3. Daugavietis, M. Basic trends in utilizing tree foliage;
4. Demenev, V.V.; Nagimov, Z.Ya.; Tepikin, S.V.; Usol'tsev, V.A.; Sharafutdinov, R.R. Profile and thickness distribution of branch and root biomass as specific characteristics of forest biological productivity;
5. Freidin, A.S.; Malyarik, M.G.; Grib, A.E.; Klausner, G.M. Modified resorcinol resin adhesives for timber and wood boards;
6. Freidin, A.S.; Myshelova, G.N.; Pokrovskaya E.N. Complex wood protection by meals of compounds on the basis of trichlorethylphosphate;
7. Golod, D.S. Pollutants influence on sub-Taiga forest ecosystems, growth and productivity of arboreous rocks in the South West of the Russian plain;
8. Isaev, A.S. Condition of the forests in the USSR; Forest policy implication;
9. Isaev, A.S. Forest decline and policy implication in the USSR;
10. Kairiukstis, L. Forest decline attributed to air pollution and climatic changes in the west part of the USSR and the Baltic Region: methods applied and results;
11. Kalashnik, N.A.; Presnukhina L.P. Population variability of *Pinus sylvestrys* L. karyotype in the South Urals;
12. Kodar, M. The influence of mineral substances on Estonian pine forest soil;
13. Kozlov, M.V. The ecology of Lepidoptera in forests suffering from air pollution;
14. Kreituss, A. Investigation of wood preservation in Latvia: New preservatives, interaction on different structural levels;
15. Lapa, I. Phenolic compounds as sex markers of some deciduous tree plants;
16. Leitass, A.M. A modern approach to the design of ergonomically safe control systems for forest machinery;
17. Leitass A.M. An approach to thinning methods and related machinery;
18. Makaimanko, N.A. New fire-proofing, bio-protecting preparations;
19. Maksimenko, N. Some general principles and methods of creation of wood preservatives harmless for the nature protecting;
20. Martinovich, B.S. Optimization of water exchange of coniferous arboreal plants in mixed phytocenosis;
21. Melekhov, I.S.; Stepanenko, I.I. The influence of mineral fertilizations on wood structure of the pine *Pinus silvestris*;
22. Moiseev, N.A. Forest management problems in forest sustained multiple use;
23. Molchanov, A.G. Solar conversion of pine and birch forests in the southern taiga;
24. Mozhaev, D.V.; Nemtsov, V.D. Multi-factor approach to the perspectives of logging technology and technique;

25. Nemcov, V. Centralized processing of full tree as the main system of harvesting, transport and processing in the USSR;
26. Pegov, L.A. Birch stand simulation with direct account of crown competition;
27. Petrov, A.P. Economic and ecological priorities to develop forest industry and forestry in the USSR under perestroika;
28. Petrov, A.P. Proposed economic and ecological priorities in forest utilization reproduction for the USSR;
29. Pirags, D. Breeding and seed production of forest trees in Latvia;
30. Pleshanov A. Air pollution studies in USSR forests;
31. Popova, N.M. Exametabolites of *Betula pendula* Roth. as a factor, regulating *Pinus silvestris* L. growth;
32. Putenikhin, V.P.; Ishbirdin A.R. Differentiation of *Larix Sukaszewii* in the South Urals;
33. Rostchin, V. A method to analyse chemically the foliage of Pinaceae;
34. Samtsov, A.S. Influence of over-flooding and flooding on ecophysiological properties and productivity of coniferous phytocenosis;
35. Sannikov, S.N. Outline of cyclic erosional-pyrogenic theory of common-pine natural renewal;
36. Sannikov, S.; Sannikova, N.; Petrova, I. Cyclic fires as an evolutionary-ecological factor of structure, transformation, regeneration and stability of pine forests;
37. Sarajishvili, K.G. The order and chaos in biological system;
38. Shalaev, V.S.; Rykunin, S.N. Trends in technology development in sawmilling-and-woodworking industry;
39. Sidorov, V.; Pokrovskaj, H. Silylation and phosphorylation of wood;
40. Starova, N.V. Principles of preservation and reproduction of valuable gene pool of coniferous populations;
41. Tsarev, A.P.; Tsareva, R.P. Poplar breeding in the regions of temperate climate of the USSR;
42. Usol'tsev, V.A. Mensuration of forest biomass: modernization of standard base of forest inventory;
43. Vasyutin, O.V. Accumulation of biomass of hybrid willows in different regions of Euroasia;
44. Voronkov, N.A. New data on the hydrologic role of forests and watershed management;
45. Yanbayev, Y.A.; Shigapov, Z.N. Genetic variability of scots pine (*Pinus sylvestris L.*).

Interesting facts

One of the participants shared his impressions of the Congress in two words: Gigantisme and Balkanization. He also gave a broader feeling about the Congress, hosts and forests: "Let us remember also that the beautiful Province of Quebec, our host, as well as Canada, should most appear to us as a pioneer region where the forest is operated as a mine. The loggers have indeed reached the limits of possibility and undertook for five years under the leadership of the Government, an intensive campaign of reforestation, mainly with resin-yielding species, requiring considerable research effort, public and private, which in many areas is in the forefront of technology. Let us remember also that the Quebec is very aware of his surroundings and very knowledgeable about it. He knows how to safeguard its forest heritage, three times as large as ours, plays a major role in maintaining the balance of air and aquatic ecosystems. This country deserves to be visited and to be regarded as one of the major partners in forest research" (Teissier du Cross 1991, p.249-250).

On August 8, 1990, Wednesday afternoon, in the presence of about 500 participants, the first Forester's Forum was held at the IUFRO Congress. It was organized to discuss and exchange views

among Canadian forestry and forest industry specialists and Congress speakers and participants on forest research and forest management. Key speakers were Dr. Paul A. Addison, Director, Canadian Forestry Service, Natural Resources Canada; Professor Jiro Kikkawa, ornithologist, University of Queensland, Australia; Dr. James A. McNutt, President & CEO, Jaakko Poyry Consulting Inc., USA; Emile Ouellet, Ministry of Energy and Resources of Québec, Canada; F.L.C. (Les) Reed[249], University of British Columbia, Canada; and IUFRO Honorary Member, Professor Ulf H. Sundberg[250], University of Agricultural Sciences, Sweden.

At the time of the IUFRO Congress, the Union included about 670 member organizations and almost 14,750 professionals, dealing with forest sector issues, representing governmental agencies, universities, institutions, and associations on natural resources. The scale of the Congresses and time difference in obtaining the information usually result into a blurred picture of the number of the Congress participants, as well as the number of countries represented. According to one source, the Montreal Congress was attended by 2,006 people from 91 countries (IUFRO 1992, p.33) while the other sources report over 2,300 participants (O'Loughlin 1990, p.8), and up to about 2,500 participants from nearly 70 countries (Sesco and Whitmore 1991, p.25). According to President R.E.Buckman "by 1990, one hundred six countries and seven hundred research institutions were members" (Steen 1992, p.101).

In 1990, the International Union of Forest Research Organisations celebrated the 100th anniversary of the first International Agricultural and Forestry Congress in Vienna, on September 6, 1890, when the idea to establish such a Union which had been put forward. At the 24th meeting of its Executive Board, in Vienna, Austria, in May 1990, IUFRO celebrated the 100th anniversary of this major event in global forest research, enabling the forest research community to share their knowledge, their efforts and their results. To mark this event, IUFRO President Robert E. Buckman presented Austrian Federal Minister of Agriculture and Forestry Franz Fischler with a bronze plaque with the following inscription in German: "In the Memory of the International Association of Forest Research Stations. On September 6, 1890, at the Agricultural and Forestry International Congress in Vienna, Karl Böhmerle, Engineer, Member of the Imperial and Royal Forest Experiment Station at Mariabrunn, presented the proposal to establish the Union. The International Union of Forest Research Organisations. IUFRO 1990" (Teissier du Cross 1990, p.620).

[249] The Chair of the Natural Sciences and Engineering Resources Council Program at UBC, Canada.
[250] One of the major Swedish forest scientists of the 20th century. From 1952 to 1986, he was active in IUFRO.

Chapter 25
IUFRO celebrates its 100th anniversary! August 31 - September 4, 1992, Berlin - Eberswalde, Germany

This Chapter is based on documents of the Centennial Congress (IUFRO 1992a, b), leaflets (IUFRO 1992c, d) and special studies (Wudowenz 1992), dedicated to the 100th Anniversary of the Union, as well as the reminiscences of the Congress participants (Schmutzenhofer and others, published in IUFRO News 1992, Teissier du Cross, 1993).

The authors of the papers, presented at the Congress might publish them elsewhere, but with references, e.g., in the following wording: "this article was presented at the Centennial Congress in Eberswalde/Berlin, Germany, in September 1992". Other celebration events included a number of conferences and seminars under the auspices of IUFRO in many European countries, as well as publications highlighting the role of the Union and aimed at promoting further cooperation. E.g., on the occasion of the IUFRO Centennial, the USSR State Forest Committee published a collection of papers, describing Russian forests and research capacity of the country so that the international forest research community could learn more and come to a better understanding of their Soviet colleagues' aspirations (Управление лесами 1990).

Overview

In 1992, the world community celebrated the 100th anniversary of the International Union of Forest Research Organizations (Perttu 1994a).

After the unification of Germany on October 3, 1990, there was no need to debate the venue of the Congress: the Centennial Congress under the title: *100 years of IUFRO* was held in its cradle – in Eberswalde - about 60 km north-east of Berlin.

According to the preliminary list of participants (IUFRO 1992b) some 888 people from 66 countries were registered to participate in the Congress. The most numerous delegations were those of Germany (172 people) and the USA (118). More than 30 people came from Japan (51), Austria (44), Finland (39) and Sweden (37). More than 20 people were from Canada and France (28), the United Kingdom and Poland (27) Switzerland (26) and Czechoslovakia (25), and 10 or more people were from China and Norway (17), Italy (16), the Netherlands (16) and Slovenia (10 people). The Russian Federation was represented by the nine participants: A.S. Isaev (International Institute of Forest, Moscow), P.T. Voronkov, V.S. Chuenkov and N.V. Krasavchikova (VNIILM, Pushkino), A.P. Petrov (VIPKLH, Pushkino), V.I. Kharuk and I.M.Danilin (Sukachev Institute of Forest, Siberian Branch of the RAS, Krasnoyarsk), N.A. Beloussova and S.S. Zyabchenko (Forest Institute of the Karelian Research Centre, RAS, Petrozavodsk). Actually, over 1,200 people, including accompanying persons, attended the celebrations (Cayford 1992).

Registration of participants and the meeting of the International Council were held in Berlin at the Humboldt University, on August 30, 1992. The celebration took place in Eberswalde and many other cities. The Centennial Congress was held on August 31, 1992, in Chorin, a town close to Eberswalde.

After lunch, the participants took seven different excursions. In the evening, a gala dinner was offered in the Abbey, and ended with a festive concert of the Berlin Radio Symphony Orchestra

conducted by Erich Wächter. The performance included music of Johann Sebastian Bach and Ludwig van Beethoven.

In fact, much more participants attended the celebrations because the Centennial Congress was hosted by many cities in Germany, and the information was published in hundreds of reports in the proceedings of the conferences or individual sections of meetings dedicated to the anniversary.

The Congress began its work on August 31, 1992, near Chorin in the Cistercian Abbey/Monastery, with its buildings dated back to 1273.

The Opening Ceremony was very solemn. On a small hill, men dressed in garments of the late 19th century were seating to imitate the "founding fathers", almost the same as at the old photos of the time. The program was intervened with the music performance of an orchestra, including traditional hunting horns. In honour of the Congress, a memorial plaque was installed on the old building of the Forest Academy in Eberswalde, and a variety of souvenirs and the memorial envelopes with post stamps were offered to participants.

Scientific program

Four IUFRO Past-Presidents and the current President participated in the Congress: they were Ivar Samset (1972-1976), Walter Liese (1977-1981), Dushan Mlinsek (1982-1986), Robert E. Buckman (1987-1990) and Salleh Mohd. Nor (1991-1995). The sixth leader – Bernhard Danckelmann (1894-1896) was also present in the form of his monument, standing in front of the old building of the Forest Academy at Eberswalde.

At the opening of the Congress, various speeches and papers were presented, largely reflecting the trends and objectives, identified at the United Nations Conference on Environment and Development of Heads of State and Government in Rio de Janeiro (UNCED 1992) which was held about 3 months before the Congress.

Professor H.F. Joachim, Head of the Organizing Committee, and Dr. M.N. Salleh, IUFRO President, welcomed the Congress.

President Salleh thanked the organizers for their hospitality, and the delegates for their participation in that significant event. He also noted that one IUFRO century had ended, and the second one had started. The Centennial Congress was held a few weeks after the Summit in Rio de Janeiro, and it was important for IUFRO to remain responsive and keep abreast of the situation all the time. He expressed hope that IUFRO could play its role in facilitating the decision-making process after UNCED and use the important role of research in the context of the discussion of UNCED. President Salleh also demonstrated his well-known sense of humour in a phrase: "No birthday cake today, but if we had one, we would need lots of candles; Bob Hope said that you know you are getting old when the candles cost more than the cake" (IUFRO News 1992, p. 3).

Next speakers were Mr. I. Kiechle, Minister, Federal Ministry of Food, Agriculture and Forestry, Germany, Dr. M. Stolpe, President of Brandenburg, and Dr. Hollis C. Murray, Assistant Director-General, FAO.

Dr. Hollis C. Murray reminded the audience about the development of relations between IUFRO and FAO, working together under large projects, such as, e.g., the Oxford System of Decimal Classification; the IUFRO Special Program for Developing Countries; the prepared SPDC Strategic Plan through the Task Force on Tropical Forestry Research, etc. He emphasized that IUFRO should play an important role in the implementation of forest-related UNCED decisions. Recalling that Friedrich Wilhelm Pfeil[251] fought for intellectual freedom in the forestry sector, in order to overcome traditional and dogmatic views, to comply with the rules of nature, Mr. Murray

[251] Friedrich Wilhelm Leopold Pfeil (1783-1859) was a German forester, founder and the first Director of the Academy of Forestry in Eberswalde.

noted that IUFRO always followed intellectual freedom in forest research, and it could be "the scientific conscience of the forest research community".

Professor W. Liese delivered his keynote address under the title: 100 years IUFRO: tradition and commitment, and President Salleh made his second presentation: IUFRO contribution to the sustainable management of tropical forests.

During the Centennial Congress in Berlin and Division 5 meeting in Nancy, three outstanding IUFRO members received the highest award – IUFRO Honorary Membership; they were Professors Riccardo Morandini (Italy), Robert Youngs (USA) and Richard K. Hermann (Germany/USA).

On September 1, 1992 at the Centennial Plenary Session, the IUFRO Distinguished Service Award (DSA) was presented by President Salleh. Its recipients were (i) Dr. W. Baltensweiler (Switzerland), Deputy Coordinator, Division 2, Leader, Task Force for Forest Decline and Air Pollution; (ii) H.-F. Joachim (Germany), Chairman, Centennial Organizing Committee; (iii) Dr. J. Materna (Czechoslovakia), lead specialist in forest damage from air pollution; (iv) Professor H. Rubner (Germany), lead specialist in forest history since 1963; and (v) Dr. L. Strand (Norway) who received his DSA on the occasion of the 75th anniversary of the Norwegian Forest Research Institute (IUFRO News, 1992).

After the centennial celebrations at the Technical University in Berlin, one-day plenary sessions were held on September 1, 1992. Of that day, the participants were offered 11 key presentations, delivered by leading experts from 7 countries and FAO.

Dr. A. Kurt (Switzerland) talked about sustained yield principles in European forestry (Das Nachhaltigkeitsprinzip der Forstwirtschaft in Europa) and presented a historical overview of efforts to address it in Europe when the term "sustainability" had been introduced more than 250 years ago: "Nachhaltigkeit" in forestry in the translation of "sustainability" could mean "sustainable yield" as well as "sustainable utilisation". The idea of sustainability was introduced because of the concern about actually decreasing timber resources in Europe in the 18th century and with the intention to take preventive measures for the future (IUFRO News 1992, p.8).

In his address *Sustained yield principles in forestry outside Europe* (*Les principes de rendement soutenu en foresterie tropicale*), J.-P.Lanly (FAO) gave a broader description of the sustainability principle outside Europe, mainly using the example of tropical forests, highlighting three periods in their management. He stressed that at the first, the longest stage, tropical forests had been largely used by local population for different purposes (construction, energy, food, medicinal purposes), although the forest cover had remained at 80-90% in many places. However, commercial logging in tropical forests began much later, primarily by large industrial companies under the umbrella of colonization in the 19th century – the early 20th century, mostly in Asia and Africa. High demand for wood sometimes led to the entire deforestation in vast forest areas in the most vulnerable regions. At the third stage, in the era of decolonization in the second half of the 20th century, the concept of wood production management of tropical forests had been developed, with methods of scientific forestry introduced in Asia, Africa, the Pacific and the Caribbean. There had been failures, especially in the late 1980s when critical assessments undermined the beliefs in reliability of sustainable use paradigm. Nevertheless, new encouraging factors had emerged in recent years, i.e., increased awareness and correct understanding of sustainable forest management by a growing number of decision-makers and planners in tropical countries, non-governmental and other organizations and people.

There was a consensus among the majority of members of these groups in relation to the concept of sustainable development, a multi-purpose forest management, integrated land-use planning and forestry, conservation of forest ecosystems, incentives for local people in forest management. He said: "Various constraints, however, exist, relating to land-use planning and to the

technical, economic, social and institutional feasibility of tropical forest management which need to be addressed" (ibid., p.8). Many ecologists recognized that the main cause of deforestation was the horizontal expansion of all forms of agriculture, exacerbated with poverty and growing demand for land and fuelwood. It was noted, that any ban on the development of forestry, forest use and import of tropical timber and products from developing countries, at best, would be ineffective and at worst – counterproductive. It was not effective, since the reasons of deforestation were to be found mostly outside forestry. It was counterproductive, because the local and national communities were seeking land use change if they were unable to get forest revenue.

Held in June, 1992, the UN Conference in Rio de Janeiro showed how forest management, which was the raison d'être of our profession, became important for politicians and for world public opinion. On the other hand, for the first time in history, all governments had approved the Forest Principles that could serve as a basis for efforts in creating mechanisms to facilitate international cooperation in forestry. In this respect, the IUFRO Centennial had just what was needed for management of forests around the world, including tropical forests.

The speech of J. Pollanschütz (Austria) about the importance of long-term experiments for the development of forest sciences (*Die Bedeutung langfristiger Versuche im Hinblick auf die Entwicklung der Forstwirtschaft*) described three long-term silvicultural experiments with pure Norway spruce stand treatment. "Results allow to make suggestions for optimum stand establishment with sufficient growing space for individual trees" (ibid., p.8). Similar experiments were undertaken in many other places in Europe.

H. Brandl (Germany) made his presentation, called: Developments in German forestry and forest science and their impact on international forestry (Entwicklungslinien in deutscher Forstwirtschaft und Forstwissenschaft mit Internationaler Ausstrahlung); it stressed that forest management and forest science were under the pressure of social and economic conditions, although, documents showed that some evidence of well-tended forests could be found in the 13th, 14th, and 16th centuries. Then, the speaker underlined that Germany had become the first country that had introduced independent forest management, and then – forest science and forest education, and its experience benefitted many countries.

H. Schulz (Germany) spoke about development of timber utilization (*Entwicklung der Holznutzung*), and showed that the nature of timber utilizations had changed under industrialization when other materials (coal, metals, etc.) had substituted timber in its traditional spheres of shipbuilding, construction, crafts, etc. Recently, especially in the 21st century, the attitude towards wood and forests had changed mostly due to environmental concerns.

In his presentation about the development of forest operations, I. Samset (Norway) traced the role of IUFRO in *forest operations research* over the past half a century. That issue was important, among other things, for the reason of increased forest biomass production for energy. In fact, forest operations had become a scientific discipline as it was in the focus of applied research, associated with forest felling, transportation, labour and other issues. In this regard, the role of IUFRO was increasingly growing both through strengthening of scientific components in improving the efficiency of forestry and logging operations, and communicating research results and scientific findings to decision-makers.

J. Materna (Czechoslovakia) and H.J. Fiedler (Germany) made their presentation on forest damages caused by chemical changes in the atmosphere (*Waldschäden als Folge chemischer Veränderungen der Atmosphäre*), and on broader aspects in this area; H.G. Lund (USA) spoke about *forest threats and their global monitoring* and underlined the importance of economic, social and environmental value of forests. He warned about the unprecedented rates of forest resource depletion in tropical countries, and biodiversity and productivity losses in the temperate zone. The same

economic, social and environmental factors themselves created or were the source of threats to forests. Several groups, including the FAO, conducted multi-country research to assess the planetary carrying capacity and changes. The speaker also underlined that the some efforts were independent and sometimes uncoordinated. As a result, there were gaps in knowledge in some areas and duplication in others. In this context, international organizations and cooperating countries should work together "towards a common global monitoring goals, to provide a complete picture of the status and trends of the world's forest resources" (ibid., p.9). In this regard, IUFRO played an important role from the scientific point of view as it helped to coordinate global activities through developing guidelines on forest monitoring, using the latest techniques and technologies, ground-based and space observations, statistical analysis and establishing new markers/sample plots.

J. Burley and Ph. Adlard (UK) made a presentation on *plantations, silvicultural research and genetic improvement*; they noted that many reforestation and afforestation programs were based on international and regional cooperation with the century-long history under te IUFRO's leadership. They referred to international species and provenance studies, including exploration, evaluation, conservation and utilization of genetic resources of species for industrial and rural plantations, and traditional genetic improvement (IUFRO News 1992, p.9) and studies in other areas to demonstrate numerous advantages of networking among scientists and forest administrations.

R. Solymos (Hungary) made a presentation about *afforestation in response to agricultural overproduction* (*Aufforstung als Mittel gegen landwirtschaftliche Überproduktion*). The speaker said that for a long time, European forests had been cut down for different needs such as agriculture, construction, roads, etc. As a result of deforestation and forest degradation, floods, water and wind erosion of soil, timber shortages had changed the attitude towards forests and triggered reforestation almost everywhere. He also noted that the post-war development of agriculture and its industrialization, differentiation of countries in the European Union had led to agricultural overproduction. Agricultural production had ceased to be profitable, because it required large expenses for tillage, maintenance of soil fertility, particularly on difficult and poor soils, on the marketing of the products or even entering the market, etc. The solution was to reduce cultivated land areas and initiate afforestation of poor soils with mixed forests for ecological purposes, and fast growing species on more fertile soils to get some economic benefits in future from timber harvesting. The reduction of cultivated land area had resulted into gradual growth of forestland area, especially in industrialized countries such as Germany and the UK. E.g., Germany's forest cover had increased to almost 30%. Thus, agriculture, forestry, nature conservation, land use and economic issues could be brought in harmony.

The final plenary speech was the presentation of D. Heinsdorf and G. Hofmann (Germany), titled *Site-specific forestry* (*Standortsgemäße Forstwirtschaft*); it was based on the ideas of F.W.L. Pfeil, founder of the Academy of Forestry at Eberswalde.

On the next two days, technical sessions were organized in Berlin by the six IUFRO Divisions (not presented in this book).

Unlike many other congresses and conferences, the Centennial Congress produced numerous forest science and forestry publications, especially in the framework of Division 1. In line with IUFRO's efforts to support and strengthen forest research in developing countries, the Tropical Silviculture Workshop was organized on September 1-3, 1992 by IUFRO Working Party S01.07-00 (Tropical Silviculture), and its proceedings were published in Kuala Kuala Lumpur, Malaysia (Wood, Vanclay, Wan Razali, Wan Mohd 1992).

Potential of tropical trees for domestication and rebuilding of forest resources was discussed at the Symposium, organized by the Edinburgh Centre for Tropical Forests at the Heriot-Watt University (Edinburgh, August 23-28, 1992) as a part of the IUFRO Centennial (Leakey, Newton 1994).

Air pollution and its impact on forests have been addressed by IUFRO since the post-war period. They remained highly relevant in the early 1990s, especially in the so-called Black Triangle region, composed of parts of the three countries: Germany (Saxony), Poland (Silesia) and Czechoslovakia (Bohemia). In particular, the workshop on forest ecosystem development on degraded and reclaimed sites was organized on September 2-4, 1992, by the IUFRO WG on forest dynamics in the framework of the Centennial Congress in Berlin (Fanta 1994); and the 15th International Meeting of Specialists in Air Pollution Effects on Forest Ecosystems was held to discuss air pollution and interactions between organisms in forest ecosystems (Tesche and Feiler 1993) on September 9-11, 1992, it addressed air pollution issues in industrialized countries. Great interest was aroused by the topic of short-rotation wood crop: atmospheric pollution, climate change, and energy in connection with air pollution, climate change and energy recovery (Ranney, McLaughlin, Wright 1992) as well as the role of multipurpose tree plantings for wind protection, erosion control and environmental enhancement (Kenney 1992). Forest genetics and breeding were discussed at the meeting, organized by IUFRO Working Party S2.02-07 (Division 2) from different perspectives, including ongoing provenance studies in many countries and growing forests of different tree species (Weisgerber 1992).

Short rotation coppice energy plantations were discussed from technology and economic points of view (Division 3) (Ford-Robertson and Mitchell 1992). Silviculture for abundant growth was usually compared with agricultural production and called “intensive forest cultures”, “forest with mini-rotation age”, “energy plantations”. Such forest plantings were common in Northern Europe, North America, Great Britain, Northern Ireland and other countries. Such forest cultivation was supported by the International Energy Agency[252], which initiated the wood energy agreement, which, however, did not have further development.

Historically, one of the most “productive” IUFRO Divisions was Division 4 as it generated abundant studies and publications. Its conferences were held on different topics such as growth and yield research with an emphasis on mixed stands, organized by IUFRO Group S.4.01 at the University of Munich (Preuhsler 1992); forest management and business administration as guarantors of sustainability (Forsteinrichtung und Betriebswirtschaft - Garanten der Nachhaltigkeit), organized by IUFRO Group S.4.04 in Tarandt (Kurth 1992), and statistical methods, mathematics and computers – by IUFRO Group S4.11-00 in Birmensdorf, Switzerland (Köhl and Gertner 1993).

In Denmark, there was an interdisciplinary conference of IUFRO Divisions 4 and 6 on Sustained Yield: Historical, Economic and Political Aspect (Gundermann 1992).

On August 23-28, 1992, IUFRO Division 5 held a conference in Nancy (France) on Better Wood Products Through Science which was attended by 475 scientists from 62 countries (IUFRO News 1992, p.11). Division 6 considered a discussion of scientific research in the 1990s (Kiil 1993).

It is worth to note the use of other opportunities for publishing information about and from seminars and symposia, held in the framework of the IUFRO Centennial Congress. In particular, the *Agricultural and Forest Meteorology* Journal published a special IUFRO issue: Global Climate Change and Applied Forest Hydrology, based on the conference (Perttu 1994b) or the *Forest Pathology* Journal offered space for the review of posters on phytopathology, presented at the conference (Brown and Anderson 1992), etc. There were also separate publications with reviews of IUFRO activities in the specific research areas, such as genetics and breeding (Kriebel 1992) or entomology (Baltensweiler and Stark 1992).

Many other papers were published by Russian and foreign scientists in different languages

[252] The International Energy Agency (IEA) was founded in response to the oil crisis of 1973-1974 to assist countries and coordinate collective response to major disruptions in oil supplies.

and on different continents in the Jubilee year 1992. E.g., Academician I.S. Melekhov wrote an article with an overview of the participation of Russian and Soviet scientists in IUFRO throughout the history from the first to the last Congress, showing positive aspects of the membership in the Union, and lack of representation of the Soviet and Russian scientists in the IUFRO Congresses and activities (Мелехов 1992).

Professor A.P. Petrov published an article in German to highlight Russia's cooperation in IUFRO in reality and expectations (*Rußlands Mitarbeit in der IUFRO - Wirklichkeit und Vorstellungen*). The author showed the role and place of Russian IUFRO members: "The participation of Russia in IUFRO activities should be intensified in view of the importance of Russian forest resources. Public opinion is concerned about the destiny of tropical forests. But to the same extent, it is necessary to preserve the already damaged boreal forest belt which is protecting the temperate zone of Eurasia" (Петров 1992, p.284) and urged to protect forest resources of Russia.

On the eve of the IUFRO Anniversary, forest historian Harold K. Steen undertook an extensive interview with outgoing IUFRO President Robert E. Buckman (Steen 1992), and Vice-President James H. Cayford from Canada; and Colin O'Loughlin from New Zealand shared his information and impressions of the Congress (Cayford 1992; O'Loughlin 1992).

After the unification of Germany, its scientific capacity increased. IUFRO has been adhering to its non-political principle during the entire history of the Union. In this regard, a remarkable action was undertaken by the leader of the Centennial Congress organizers, Dr. Hans F. Joachim from Eberswalde: he prepared two articles about the scientific life in East Germany to be published in a special issue of *Silvae Genetica*. These two distinguished scientists – Professor Dr. Hans Schönbach (1911-1984) from the Tharandt Academy and Dr. Otto Schröck (1909-1989) from Waldsierversdorf near Eberswalde – played a noteworthy role in international forest science.

Organizational matters

The International Council met on August 30, 1992, at the Humboldt University in Berlin. It was attended by representatives of 52 countries. Since only two years had elapsed after the previous Congress, only major issues were addressed; they were the development of the Union, the reports of the President and Vice-President, Secretariat, Treasurer and SPDC Coordinator. At the International Council meeting, it was proposed to establish a IUFRO Development Fund for research capacity building in developing countries; to raise the basic IUFRO membership fee by 10% compared with 1994; to extend the agreement between IUFRO and the Austrian Government for the provision of facilities and staff for the IUFRO Secretariat at the Austrian Federal Forest Research Institute in Vienna; to prepare a IUFRO medium-term strategic plan; to consider the IUFRO budget for 1993 (with 70% from membership fees, and 30% from the donations/grants); to discuss the theme of the 20th IUFRO World Congress in Tampere (Finland) in 1995; these proposals were discussed and adopted.

The establishment of the IUFRO Development Fund was on top of the agenda. Canada became one of the donor-countries, and Jean-Claude Mercier, Deputy Minister of Forests, Canada, ensured the endorsement of the decision at the Congress that the proceeds from the IUFRO World Congress of 1990 in Montreal (amounting to about $59,000) would be transferred as a contribution to this Fund. Mr. Mercier made this announcement in his capacity of the Chairman of the Canadian Advisory Council for IUFRO for the 1990 Congress. It should be noted that the entire group of Canadian IUFRO members had provided financial support to the Congress. The second contributor was the Royal Swedish Academy of Agricul-ture and Forestry, which contributed about $30,000 from almost all Swedish IUFRO members.

IUFRO President Saleh made an announcement about the establishment of this Fund at the Centennial Congress. The Fund was intended to be used to enhance the level of scientific research in developing countries and economies in transition. Its activities included support for research workers, participating in conferences and seminars, promotion of IUFRO activities, post-graduate and other training. The Fund was expected to work with the proceeds from the investment. Policy direction would be determined by the Board of Trustees to consist of representatives from the IUFRO leadership, developing and other countries, as well as donor organizations. The Fund would be managed through the Special Programme for Developing Countries (SPRS), and the Program Coordinator would be the Secretary of the IUFRO Executive Board.

Areas of work for the next IUFRO Congress were also proposed and discussed; they included: ecology of tropical forests, biodiversity, global physical change in the ecological balance (water, carbon dioxide, and waste management), and forest in the arid zone.

The representative of Peru informed about the status of forest science in the country; the destruction of some forest experimental stations by terrorists, and the murders of scientists. However, despite the difficult situation in Peru, the country wanted to remain active in IUFRO, but it asked to be exempted it from the membership fees.

Resolutions

International Union of Forestry Research Organizations
Berlin Declaration
August, 1992

Recognizing that:

In August, 1892, at Eberswalde, Germany, the International Union of Forestry Research Organizations (IUFRO) was formed.

In August, 1992, we commemorate the Centenary, the 100th birthday, of the International Union of Forestry Research Organizations.

IUFRO has grown to include more than 15,000 scientists from over 700 member organizations in 111 countries.

For 100 years, IUFRO has promoted international cooperation in forestry and forest products research together with the development and standardization of research techniques. Many advances in global forestry and forest products utilization have resulted from this research.

Forest ecosystems are essential to the economic, social, spiritual and environmental well-being of all citizens of the world.

The Meeting resolves that:

IUFRO will continue to be an advocate of science-based forestry policy and decision-making and will serve as the scientific conscience of forestry.

IUFRO will maintain and expand its strength and reputation as a credible source of scientific information into its second century.

IUFRO will improve the exchange of and access to new scientific information.

IUFRO member institutions and scientists are committed to work unstintingly toward ensuring that the forestry programmes of Chapter eleven of Agenda 21 from the United Nations Conference on Environment and Development are carried forward with the best possible scientific and technological support.

IUFRO will continue to serve society by offering support for the conservation, use and restoration of forest ecosystems, based on sound scientific principles.

IUFRO will expand its cooperation with international scientific and other organizations, including institutes of the Consultative Group for International Agriculture Research.[253]

IUFRO will respond to the changes in the global political scene, and harness the opportunities provided, by strengthening its activities in the newly emerging countries and in the developing world.

Excursions

Before the Congress, from August 23 to 28, 1992, IUFRO members, primarily from Division 5 (Forest Products), went on the Nancy (France)–Berlin excursion where they held a Conference of Division 5. The Conference was co-sponsored by the Association pour la Recherche sur le Bois en Lorraine (ARBOLOR). Then, the participants came to Germany to attend the celebration events.

After the official program, on August 31, 1992, several excursions were offered, and they were followed with a dinner, ceremony of the IUFRO Centennial Plate unveiling at the old building of the Academy of Forestry, planting of trees in Eberswalde by the representatives of the countries. The excursions covered all the IUFRO areas:

1. Experimental yield plots
2. Provenance trials
3. Ecosystem research
4. Exceptional landscapes
5. Eberswalde Forest and Timber Research Centre
6. Historical forestry sites

On the last day, several one-day excursions were offered to show forest management activities in areas adjacent to Berlin:

1. Silviculture on sites suited for broadleaved species
2. Intensive pine management under natural conditions
3. Ecological conversion of degraded pine forests
4. Plantation of exotic tree species
5. Forest tree breeding and propagation
6. Eberswalde Forest and Timber Research Centre
7. Forestry in the conurbation of Berlin-Potsdam

Multi-day post-Congress excursions in Germany were also offered:

1. Landscape preservation, rehabilitation of mining areas
2. Educational and research establishments in Tharandt/Spruce stand management and forest damage in the Ore Mountains
3. Timber processing
4. Forestry in highland and hill country (Harz Mountains, Thuringia, Hesse, Lower Saxony)
5. Forest ecosystems research (Eberswalde and Tharandt)
6. Forestry and landscape preservation in north-eastern Germany up to the island of Rügen.

The multi-day international post-Congress tours were as follows:

A. Berlin - Thuringia/Hesse/Bayern/Baden-Württemberg - Zurich (Switzerland);

B. Berlin - Dresden/Tharandt - Prague (Czech and Slovak Federal Republic) – Sopron (Hungary) - Vienna (Austria);

C. Berlin - Poznan/Kornik (Poland) - Southern Poland - Ore Mountains - Dresden (Germany) (recommended for Division 2).

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[253] The Consultative Group for International Agriculture Research (CGIAR).

Interesting facts

After the hundred years, the Union turned from an organization that involved a few dozen of people into a powerful international association, uniting 15,000 scientists in 710 affiliated organizations in 105 countries around the world (IUFRO 1992d). It is also interesting to note that the registration fee for the participants of the Centennial Congress was DM 250, and for participates, younger than 35 years old, it was reduced to DM 150.

Chorin, the venue of the Centennial Congress, was remarkable place owing to years of efforts of the prominent German forest scientist of the early 20th century Alfred Dengler (1874-1944) who had been the Senior Forester in Chorin (1921-1927) and Professor of Forestry in Eberswalde Forestry University (1922-1944). He was the author of the textbook on silviculture on an ecological basis (*Waldbau auf ökologischer Grundlage*), published in 1930. He was buried at the cemetery of the Chorin Abbey.

Another point of interest is the memorial stone in honour of Hugo Conwentz (1855-1922) at a reserved place Plagefenn, which is located about 5 km south-east of Chorin. Hugo Conwentz is considered to be one of the founders of nature reserves in Germany and in Europe. He revived the natural monument concept of Alexander von Humboldt (Борейко и Поминова 2000). By the way, the Forest Academy was founded outside Berlin in Eberswalde because it was the wish of A. von Humboldt, who wanted foresters to be closer to forest.

In his speech at the ceremony of unveiling of the IUFRO Centennial Plaque at the Old Forest Academy, President Salleh said that Past-President Walter Liese had very close links with Eberswalde and the Academy of Forestry as his father had worked here since 1922 and had been Director of the Academy in 1945. He said: "Walter grew up around this building and we can imagine our Past President playing barefooted in these surroundings in his childhood days. So the link of this Academy and Eberswalde to IUFRO is more than formal. It is embodied in the families of the IUFRO leadership. We thank you, Walter, for this honour!" (IUFRO News 1992, p.6).

During the IUFRO Centennial Plaque unveiling, President Salleh invited Past Presidents Ivar Samsct, Dusan Mlinsck, Walter Liese and Rober Buckman as well as Mr. Plattner from Austria, Mr. Wandeler of Switzerland and Dr. A. Roeder of Germany to come forward to share this sensitive moment – Past and Acting Presidents and the representatives of the countries whose predecessors signed the historical document of IUFRO's foundation.

Then, the participants returned to the Chorin Abbey where they enjoyed the Berlin Radio Symphony Orchestra, performing Johann Sebastian Bach's Brandenburg Concerto No. 3 and Ludwig van Beethoven's Symphony No.6 (Pastoral) [254].

It is also interesting to remember the notion of Heinrich Schmutzenhofer who linked the long and dry summer with the concert program. The Concerto and Symphony "masterly transposed the music into a vivid impression of the landscape. With the Pastorale, they guided the auditory into nature, providing a romantic roundup with birds' song and thunderstorm, the latter starting realistically during the fourth movement called 'Thunderstorm'. However, other than in Beethoven's music where the rain stops in the last movement, it did not so in Chorin, and the participants had to hurry to the buses through a heavy downpour" (IUFRO News 1992, p.6; Schmutzenhofer 2014).

[254] Symphony No.6 in F Major, Op. 68 ("Pastoral") was composed by Ludwig van Beethoven in 1808 in Vienna.

Chapter 26
Congress XX - August 6-12, 1995, Tampere, Finland

This Chapter draws from the Reports of the 20th IUFRO World Congress, prepared by the Congress Organizing Committee (IUFRO 1995a-c), as well as personal archives and memoirs of the Congress participants (Вагин и др. 1996; Моисеев, Писаренко 1996).

Overview

In the 20th Congress was held under the title: *Caring for the Forest: Research in a Changing World* and was personally supported by President of Finland Martti Ahtisaari. It was attended by 2,183 delegates from 103 countries (or 3,088 people, taking into account accompanying persons and participants with one-day registration).

The program intensity and the number of the Congress participants were the largest within the century of the Union existence. The agenda included 315 sessions, 1,145 papers (actually, almost 1,500), and 18 excursions in eight countries, including Russia. The largest numbers of registered delegates were from Finland (442), the USA (222), Germany (133), Japan (123), and Sweden (111). Russia was represented by a large delegation of 44 people.

Seven IUFRO Presidents attended the Congress, representing one third of the century in the life of IUFRO: the five past-Presidents – G.M. Jemison, I. Samset, W. Liese, D. Mlinsek, R. Buckman, President Salleh M.N., and President-elect J. Burley.

The Opening Ceremony had distinguished guests, including Prime Minister of Finland Mr. Paavo Lipponen, who, being a son of a professional forester, stressed his special pleasure to welcome the participants of the Congress on the Finnish soil. He stressed that "biodiversity and conservation are issues that need national and international cooperation and commitment. He pointed out that the increasing environmental awareness of consumers is not to be ignored as it could lead to transferring the costs of conserving biodiversity into consumer prices" (Norros 1996).

Four stamps with depictions of major tree species of boreal forests, i.e., pine, spruce, and birch and memorial envelope and the First Day Cover were issued in honour of the IUFRO Congress. This set was presented by President and CEO of Finland Post Ltd Mr. Asko Saviaho and its designer Dr. Erik Bruun. The other speakers were Lord Mayor of the City of Tampere Mr. Jarmo Rantanen, Assistant Director of FAO Dr. David A. Harcharick, Rector of the University of Helsinki Dr. Risto Ihamuotila, IUFRO President Salleh Mohd Nor, IUFRO Vice-President James H. Cayford, Chairman of the 20th IUFRO World Congress Organising Committee Risto Seppälä and other officials.

Scientific program

The scientific program of the Congress included welcome addresses at the opening ceremony, keynote addresses at the four plenary sessions and 6 sub-plenary sessions (altogether 25 papers), 13 Inter-Divisional Sessions (41 papers), 291 Congress Group Sessions, and 302 posters (IUFRO 1995d). Altogether 1,145 (952 invited and 193 voluntary) papers were presented in the 315 sessions. Additionally, 33 more papers were presented at 20 satellite meetings, organized by various forest-related groups (IUFRO 1995b, p.14).

Great interest was aroused by key presentations. Professor Risto Ihamuotila, Rector, University of Helsinki, delivered his presentation, called: *Forest as a Source of Economic and Social*

Welfare, and talked, among other things, about the feeling of Finns towards their forests, underlying that forests were self-evident to them. The Finnish people had the highest forest area per capita in Central and Southern Europe, and the country had developed into a modern welfare state, owing to the forestry and forest industry. From another point of view, the share of the forest sector in the national economy was decreasing year-by-year, accounting for about 20% in 1950, and less than 10% in 1990; the number of employees in forestry decreased, consequently, from 12.5 to 5.2%, and export revenue – from 74.8% to 37.2%.

Then, he stressed the role of forestry knowledge and research for the country's well-being. Forestry teaching had become part of the University of Helsinki in 1907, and in 1918 the Finnish Forest Research Institute (METLA) was founded. Later on, the Faculty of Forestry was opened in the University of Joenssuu, and recently, the European Forest Institute started its activities in the same city. However, it was not easy to create or even envisage an ideal forest sector as many factors were influencing it, including environmental (air pollution, greenhouse gases, etc.) and social (demand on forest products, jobs, recreation, etc.) challenges.

Speaking about another perspective, he said: "Irrational ideas and misconceptions about forests and their use, propagated by certain groups, have a powerful effect on the general public, which has to be considered when planning the forestry policies of a modern forestry state. Of the utmost importance is that facts based on scientific research be made available to the public efficiently, be it in the schools, the media, or among political decision-makers"[255].

The keynote address of Ms. Elizabeth Dowdeswell, the first women holding the position of the UNEP Director (Nairobi, Kenya) was presented by Dr. Reuben Olembo, Deputy Executive UNEP Director. It was called *People, Forest and Environment* and underlined that "sustainable development could only mean an integration of ecological considerations into social, economic and foreign policy making" (IUFRO 1995b, p.21). Recalling that about 180 million ha of forests, mostly in tropical countries, had disappeared since 1980, the speaker stressed the need, *inter alia*, for protection of forests as a means for poverty alleviation. "The new paradigm of development has to focus on human needs and poverty alleviation, in addition to economic growth" (ibid., p.21). Thus, harmonization of the goals required investments in human and natural capital. Then, he named a set of nine requirements for this.

The keynote address of Mr. Andrew Bennet (UK) was called *Sustainable Land-Use: The Interdependence between Forestry and Agriculture* and concentrated on the following issues: population growth and human needs; the Rio Summit – its conclusion on achieving "sustainable development for all!" and a number of documents related to conservation, management and sustainable development of forests; finite resources; prerequisites for sustainable land use, interactions and interdependence; linkages; policies; institutional arrangements; intensification. It also asked a few questions, including an issue of agroforestry as a synergy of trees, crops and sometimes livestock. The speaker stressed the necessity to have a new 'tool-box' to assess needs and design new technologies.

Dr. Ross S. Whaley, President, State University of New York (USA), structured his address on *Research and Technological Development for Sustainable Forestry* around three major propositions: "I. The period from 1990-95 brought about a change in global attitudes about forests, forestry and forest products manufacture unprecedented in the past half century. II. Signals abound that over the next few decades forestry will be practiced under social and economic conditions for raw materials and products which are significantly different than today. III. While forest industry success in the past couple of decades has been determined mostly by marketing, financial and political skill, in the future it will be influenced to a greater extent by technological adaptation"[256].

[255] http://www.metla.fi/iufro/iufro95abs/key1.htm
[256] http://www.metla.fi/iufro/iufro95abs/key4.htm#Whaley

Mr. Gurmit Singh K.S., Executive Director, CETDEM[257] (Malaysia) described his view on the issue placed as the title of the address: *NGOs & Forestry: Dynamic Interactions*. He underlined the existence of strong philosophical differences between developed (North) and developing (South) activities: the first preferred to work at the international level while the latter – at the local and national levels. But forest research should look beyond their narrow perspectives and not ignore national and global controversies over future of forests as environmental problems should seek for holistic solutions, but "this is not best addressed by the present approach" (IUFRO 1995b, p.24).

The greatest interest in the Plenary and Sub-Plenary sessions (25 papers were presented) was generated by the themes: *Global change, Sustainable land use: Interdependence between forestry and agriculture*, and *Ecological management and eco-balance*. Dwelling on one of them, Professor Anatoly P. Petrov (Russia) presented his paper about the development of property rights in forestry in the CIS during the transition period.

Interdisciplinary sessions had 71 papers, presented (IUFRO 1995e).

Most of research papers were presented at meetings of the six Divisions, Subject, Project and Working Groups.

Division 1 *Forest Environment and Silviculture* had 54 technical and 17 business sessions where 227 papers, including 21 voluntary papers, and 80 posters were discussed. The discussions were built mostly around the papers related to forest biodiversity issues, including the role of forests in biodiversity conservation different regions. Another very interesting set of presentations was addressing the silvicultural problem of preservation of oak forests where catastrophic degradation processes had been ongoing in many countries over the past 20 years. The forest meteorology and climatology subsection discussed relationships of plants and atmosphere as well as impact of climate change on forests. Papers paid much attention to restoration of degraded landscapes, afforestation of mining dumps in Germany and Romania; restoration of forests on drained agricultural lands in the United States; restoration of tropical and sub-tropical ecosystems in Senegal, Brazil, Cameroon, and Papua New Guinea; larch productivity on different soils in Northeast Yakutia (Russia).

Division 2 *Physiology, Genetics and Protection* was very well representative and diverse in research topics. There were 36 technical and 9 business sessions where 138 papers, including 17 voluntary papers, were discussed. Also, there were 112 posters from this Division – the highest number of posters presented in one Division. Participants of the Congress were keen to hear and discuss papers, related to impact of pollution on forest ecosystems and their components, and the level of influence of pollution on forests of Central Europe: susceptibility of forests to pest outbreaks; anthropogenic stresses; forest pests; influence of natural factors on the susceptibility of forests and plants to insects. A special set of papers highlighted problems of forest entomology: the degree of insect damage and stability of forest ecosystems in different countries; control of bark beetles; defoliating insects; economic and environmental impact of forest pests. This theme was the most important both in theoretical and applied aspects, it had raised many questions and lively discussion.

Division 3 *Forest Operations and Techniques* considered harvesting processes and equipment for logging operations. All groups of this Division held 41 technical and 13 business sessions where 134 invited and 42 voluntary papers were discussed. Also, there were 37 posters presented from Division 3. The discussions covered the topics of papers at the sections and were linked with the related issues of forestry, economics, nature conservation, forest protection, sustainable timber use.

Division 4 *Inventory, Growth, Yield, Quantitive and Management Sciences* had the greatest

[257] The Centre for Environment, Technology & Development, Malaysia (CETDEM).

number of presentations from many countries, including 10 papers from Russia. Altogether, 135 papers presented, including 24 voluntary papers, at 26 technical and 5 business sessions. As well, 28 posters were displayed. The papers on the use of new technologies have captured much attention and those on an expansion of aerospace methods in forest research presented in papers from Canada, Japan, Germany, Netherlands, and UK.

Division 5 *Forest Products* held 40 technical and 14 business sessions in 34 subject and working groups. Altogether 217 papers, including 55 voluntary papers and 72 posters, on a wide range of issues were presented. The most effective was the participation of our scientists in the session on new composite materials and modern technologies in wood processing. The Congress was not only a source of new information and knowledge, but also a tool to widen the research horizons and establish new contacts with colleagues. For example, one meeting with Dr. Howard Rosen (USA), WP Leader, resulted into the decision to develop collaboration of scientists from the Moscow State Forest University under the International Society of Wood Science and Technology.

Division 6 *Social, Economic, Information and Policy Sciences* held 31 technical and one business sessions where 139 invited and 28 voluntary papers were presented to cover various aspects of forest science: social, economic, information, and policy. The papers considered both traditional topics related to the history of forestry and forest industries in different regions of the world, and relatively new subjects which reflected the relationship of forestry with its associated public institutions (political and administrative, legislative and educational). Forest economy was often highlighted in the papers. It could be stated that the Division really reflected the title of the Congress: *Caring for the Forest: Research in a Changing World*. The Congress had demonstrated such relatively new areas of forest science, as forestry and rural development in the industrialized countries, recreational forests and forest landscapes, urban forestry. This Division also presented 11 posters at two poster sessions.

The most popular sessions were: Division 1 – New methods and trends in site studies (75 participants); Division 2 – Forests and the global carbon cycle (120 participants); Division 3 – Forestry machine designs: A forum with Finnish forestry equipment manufacturers (130 participants), Division 4 – Growth trends and site productivity; has site productivity changed? (110 participants); Division 5 – Composite processing – a review of developments worldwide (80 participants); and Division 6 – Methodological and theoretical aspects of forest policy analysis (90 participants). The most popular satellite meeting was titled *Scientific basis for sustainability*, it was organized by the European Forest Institute (EFI) and Centre for International Forestry Research (CIFOR) and attended by 80 participants (IUFRO 1995b).

With the acknowledged commercial orientation of research in Western countries, it was encouraging to note the focus on fundamental research in many papers. Apparently, the guiding role of IUFRO as a non-profit organization was very influential. Even technological papers on wood processing were varying in depth and of a high theoretical level. Unfortunately, there were virtually no papers, dealing with equipment and tools for wood processing. In general, most of presentations reflected a high level of scientific research in different countries, their extensive technical and computer equipment. Perhaps, qualitative results were obtained largely owing to major investments in appropriate equipment for research institutions.

Increased attention of scientists to computer technology for forest research was evident in almost all Divisions. It was noted that the forest sector was developing a network of information systems, data banks and electronic dictionaries; ICT for information and experience sharing and a systematic approach to forest research were emerging.

The main and persistent theme of papers on management, marketing and information support under market economy was sustainability as an essential part of ecosystem management. Managerial

and marketing issues were discussed in papers on the implementation of socio-economic decision-making system, aimed at improving welfare of citizens of particular regions and globally.

The word '*paradigm'* was often mentioned at the Congress. It reflected the concept, used in philosophy from ancient times, and characterized a new model and a solution of interrelated problems. Logically, it was a search and development of a new world and, accordingly, a new way of action that would rescue humanity, sliding into a global catastrophe. Through the forest sector, the Congress reflected the general situation in the world; when environmental, economic, energy, and ethical crises continued to deepen. For the time being, only the environmental crisis was covered in most mass media. In 1992, it was in the focus of the International Session of the UN FAO in Rio de Janeiro which gave an impetus to strengthen international cooperation for developing national models of sustainable development (referring to the organic combination of social and economic development with environmental protection). At the 20th IUFRO Congress, this direction was in the focus of many presentations. It involved related definitions of criteria and indicators for sustainable forest management under sustainable multiple-use of forests (Моисеев, Писаренко 1996).

In April 1995, the United Nations Commission on Sustainable Development (UNCSD) decided to establish an Intergovernmental Panel on Forests (IPF) to promote international consensus and coordinated proposals for action to support the forest management, conservation and sustainable development. The IPF was to focus on 11 issues within five interconnected groups and submit its final suggestions and policy recommendations to the UNCSD in 1997. "During the 20th IUFRO Congress, a special meeting was arranged where officers and members of IUFRO research units and of other organizations (UNSCD, FAO, UNESCO, CIFOR, EFI, IGPF, EC, etc.) discussed planning, managing and disseminating results of research on sustainable management. They sought to identify future directions and approaches to forestry research within IUFRO and through collaboration with other organizations"[258] (Norros 1996, p.96).

Organizational matters

The Congress decided to restructure IUFRO. As of January 1, 1996, IUFRO would have eight Divisions: 1 – Silviculture; 2 – Physiology and Genetics; 3 – Forest Operations; 4 – Inventory, Growth and Yield; 5 – Forest Products; 6 – Social, Economy, Information and Policy Sciences; 7 – Forest Health; 8 – Forest Environment. In addition, Subject Groups and Project Groups were combined into Study Groups, but Working Parties remained although some of them changed their names. Thus, 268 research units were formed in the Divisions.

In addition, in 1995, a Task Force was established to design a strategy for IUFRO network development and to enable to quickly obtain and disseminate relevant information using advanced technology, mainly, the Internet. The created network of 300 operating units enabled IUFRO to have a huge information base. In 1995, it launched its (IUFRO) terminology project: *SilvaVoc*. The original project acronym – *SilvaVoc* (*silva* = forest and *voc* = vocabulary, dictionary, terminology). The main purpose was cooperation of scientists for the development of a multilingual dictionary and correct use of forest terms, and in January 1996, a specialized Working Unit (S6.03.02) on Trends in Forest Terminology was created (Dobbertin and Prüller 2002).

Administratively, the Permanent Committee was transformed into the Management Board, which was the executive body of IUFRO. It included the Members of the Extended Executive Board (IUFRO Executive Board), which was to include more than twenty members. Other bodies such as the International Council, the Congress, the President, the Secretary remained unchanged.

Dr. Jeffery Burley, Director, Oxford Forestry Institute (United Kingdom), was elected

[258] The first meeting of the IPF was held in New York on September 11-15, 1995.

IUFRO President for 1996-2000. Professor Risto Seppälä, Finnish Forest Research Institute-METLA, Finland was elected Vice President for Programmes and Jerry A. Sesco, USDA Forest Service, USA, was elected Vice President for Administration.

The IUFRO Division Coordinators were also elected: D1 – J. Les Whitmore (USA); D2 – Eric Teissier du Cros (France); D3 – Dennis Dykstra (USA/Indonesia); D4 – Klaus Von Gadow (Germany), his Deputies – Victor K. Teplyakov (Russia) and Harold E. Burkhart (USA); D5 – Christian Sales (France); D6 – Niels Elers Koch (Denmark); D7 – David F. Karnosky (USA); D8 – Kyoji Sassa (Japan).

A few President's Appointees were elected: Prem Khosla (India for Indian sub-continetn), Don Koo LEE (Republic of Korea for Asia), Ruben Guevara (Costa Rica for Central America) and the others for Northern Africa or Near Est and Sub-Saharan Africa were approved during the first EB meeting at Vienna in 1996.

The following representatives of the regions were elected: Birger Solberg (Finland) for Northern Europe; Karel Vančura (Czech Republic) for Central Europe; Valentin V. Strakhov (Russia) for Eastern Europe; Ramon Elena Rosselló (Spain) for the Mediterranean; F.J. Pollett (Canada) for North America; Jose Antonio Prado (Chile) for Central/South America; Frederic John Kruger (South Africa) for Africa; Jusheng Hong (China) for Asia; and David William Flinn (Australia) for Oceania/Western Pacific. Bryane Payne (USA/Austria) became the SPDC Coordinator. The Executive Committee included a representative of the FAO (Dr. David Harcharik).

The Congress celebrations included the first presentation of the new IUFRO Scientific Achievements Award (SAA) to ten scientists from different countries. They were: (1) Luis Alberto Ugalde Arias (Costa Rica) for the Forest Management and Information System: a management information system for natural resources, databases and information schemes for plantations and agroforestry systems; (2) Ann Merete Furuberg-Gjedtjernet (Norway) Forest Engineering: Off-road transport of timber, environmentally sound forest technology; (3) John Lockhart Innes (Switzerland) Geography and Forest Ecosystem: long-term changes in forest ecosystems, (4) Antoine Kremer (France) Forest Genetics: development of early selection procedures, population genetics; (5) Constance I. Miller (USA) Forest Genetics: population genetics, evolutionary genetics, conservation genetics; (6) Abd Latif Mohmod (Malaysia) Utilization: properties and utilization of non-timber forest products such as bamboo, rattan and palms; (7) Jack N. Saddler (Canada) Forest Products Biotechnology: application of micro-organisms and enzymes to the pulp and paper industries, bio-conversion of wood wastes to fuels and chemicals; (8) Thomas A. Spies (USA) Forest Ecology: landscape analysis, ecosystem analysis, forest community structure, old-growth forests; (9) Pauline Stenberg (Finland) Mathematics and Ecology: solar radiation regime of conifer canopies; and (10) Yang Zhong-qi (China) Forest protection: parasitic wasp taxonomy, biocontrol of forest insect pests.

Robert Buckman (USA), James Cayford (Canada), and Oscar Fugalli (Italy) became new IUFRO Honorary Members.

It was decided to hold the next IUFRO Congress in 2000 in Kuala Lumpur, Malaysia, the first Congress to be hosted by a developing country.

It is worth to note that the Congress invited hundreds of volunteers, bright and often multilingual people, to make its participants feel at home. At the Closing Ceremony, Dr. Risto Seppälä, Chairman of the Congress Organizing Committee, cordially thanked the volunteers: "In my welcoming address on Monday, I said that hundreds of volunteers had been working very hard to make this Congress possible. During this week you have come to know these people in their blue-and-green-striped shirts. (…) I'll just say this: Never before have I worked with such a fantastic group as you are, my fellow Congress organizers. You have made this week an experience that I shall never forget" (IUFRO 1995b, p.51).

President-Elect Jeffery Burley made his inaugural address stressing six major points as he saw as the President: (i) challenges and opportunities for IUFRO; (ii) linkages within IUFRO; (iii) structure of the Union; (iv) linkages to other institutions and disciplines; (v) IUFRO in the developing countries, and (vi) administration. Outgoing President Salleh Mohd. Nor concentrated his speech around three words: “congratulations” and “thank you”.

Resolutions

Declaration
International Union of Forestry Research Organizations
IUFRO XX World Congress (6-12 August 1995, Tampere, Finland)

Considerations. At the approach of a new century, humankind is faced by profound political, socio-economic and environmental changes. The world is made "smaller" through more firmly linked economies and rapid communications. Increasing global populations are straining the productive capacities and health of forests and associated ecosystems.

Management of plantation and second growth forests has become more efficient. On the other hand, concerns related to natural forests are increasing in importance. These concerns include the rapid destruction and fragmentation of forests directly by fire and biological agents, and indirectly by population pressures and macroeconomic policies; the increasing loss of biodiversity; the effects of air pollution and climate change; and, the need for environmentally sound use of forests and forest products.

If critical environmental, social and economic global needs are to be met, today and in the future, forestry research requires more effective use and exchange of information between stakeholders, more interdisciplinary collaboration, and committed global partnerships. Enhanced scientific effort for sustainable forest management must work with reduced overall resources, while recognizing increasingly complex societal roles and needs.

Resolutions

The following Resolutions of the XX IUFRO Congress are addressed to all member organizations, whether government or private

1. *Recognizing* the need to support the maintenance and enhancement of well-targetted forestry and forest products research, this Congress resolves:

- To encourage research on global climate change; restoration of degraded lands; the extent, productivity and health of forests; systems and measures of sustainability and biodiversity; socio-economic, cultural, and institutional dimensions of resource management; forest products and harvesting technology; and, the relationship between agriculture and forestry.

2. *Recognizing* the need for the expansion of research capacity, especially in developing countries, this Congress resolves:

- To enhance training programmes, data sharing, technology transfer and scientific capability. The Special Programme for Developing Countries will be a key vehicle for such efforts.

3. *Recognizing* the benefit of broader partnerships for enhanced research efficiency and from improved communications between the scientific and general communities, this Congress resolves:

- To maintain IUFRO's primary role of networking among members, while increasing the intensity and frequency of interdisciplinary collaboration within the Union, and with other organizations and groups outside the Union.

- To seek to increase IUFRO member participation in Latin American, North African, Middle Eastern, Eastern European and Asian Pacific regions.
- To decentralize scientific cooperation and information sharing through a variety of national and regional mechanisms, such as the Forestry Information Network for Latin America and the Caribbean, and the Forestry Research Network for Sub-Saharan Africa; newsletters in appropriate languages; interdisciplinary symposia; and, the creation of informal IUFRO affiliations similar to FORSPA[259] and IUFRO - Japan.
- To encourage use of innovative technology to increase data sharing and research efficiency, and to optimize timely delivery of research information to the widest array of users by projects such as the Sylvavoc project.

4. *Recognizing* the benefits of more policy- and problem- oriented research, this Congress resolves:

- To use, where appropriate, Task Forces and other mechanisms to deliver integrated analyses of specific, interdisciplinary research issues.
- To emphasize research in economic and social sciences, with particular concern for the roles and needs of forest dwellers, women and children.
- To study how to develop acceptable solutions when social, economic and environmental demands are in conflict.

The Declaration stated the ever-increasing importance of addressing problems, associated with the condition of natural forests, rapid process of their destruction and fragmentation, caused by forest fire, biological factors, human activity and macroeconomic policies. The progressive loss of biological diversity, negative effects of air pollution and climate change, as well as the need for wise use of forest resources required comprehensive research, exchange of information between interested individuals and groups, close interdisciplinary cooperation, and global partnerships. Intensive research efforts for sustainable forest management were needed in view of forest resource reduction and increasingly complex social needs and expected population growth.

Excursions

One-day in-Congress excursions were organized for participants and accompanying persons (1,654 people altogether) on Wednesday, August 9, 1995, from 13:00 until 21:00. Numerous buses left from the front door of the Tampere Hall. The excursions gave an overview of Finnish forestry (especially, small-scale farm forestry common for Scandinavia), forest industry (mainly, harvesting technology), nature conservation, and national traditions and culture, and enabled to enjoy the beautiful Finnish lake scenery during the boat cruise. Some participants had a chance to experience the Finnish sauna, and in the evening, the sightseers had a traditional Finnish supper.

In addition to one-day in-Congress tour and the programme for accompanying persons, which consisted mostly of excursions, the participants were offered a number of multi-day post-Congress excursions (468 people participated), both in Finland and in the neighbouring Baltic States (Estonia, Latvia and Lithuania), Denmark, Norway, Sweden and Russia:

In-Finland excursions:

1. Multiple-use Forestry in the SW Archipelago
2. Forestry in the Lake District of Pirkanmaa
3. Wood Procurement and Forest Industries in Finland
4. Mechanical Wood Industry and its Products
5. Cancelled

[259] FORSPA – the Forest Research Support Programme for Asia and the Pacific is the FAO Initiative for tropical forest rehabilitation in Asia and the Pacific.

6. Inventory of Forest Resources and Small-scale Forestry
7. Genetic Resources and Forest Reproductive Material
8. Forestry and Nature Conservation in the Saimaa Lake District
9. Cancelled
10. Forestry and Forest Research North of the Arctic Circle
11. Protection and Multiple Use of the Natural Resources in Finnish Lapland

International excursions:

12. Broadleaved Forest Management for Multiple Use
13. Forestry and Rural Development in the Nordic Countries
14. Forestry and Biodiversity
15. Kola Excursion through Finnish Lapland and N-E. Norway to the Kola Peninsula
16. Cancelled
17. Forest Excursion to St. Petersburg
18. Forestry in the Changing Socio-Economic Conditions of the Baltic Countries

In-country excursions:

Excursion 1. Multiple-use Forestry in the Southwest Archipelago (Tampere–Nuutajärvi–Turku –Dragsfjärd–Turku–Mariehamn–Helsinki), 4 days, August 12-15, 31 participants. (Leader: Henry Schneider). On Saturday, August 12, 1995, at 14:00, departure from the Tampere Hall by bus. Visit to Nuutajärvi estate and arboretum. Possibility to visit the Nuutajärvi glass factory and museum. Travel to Turku. Day 2: travel to Dragsfjärd. Visit to Rosala island and information about the ecology of the south-western archipelago. Lunch on the island. Visit to the Archipelago National Park information centre. Travel distance 70 km by bus and 40 km by boat. Day 3: Private forestry, multiple use and care of biodiversity in small-scale private forestry. Visit to a private forest owner. Mainstreaming biodiversity into forest management planning. Preserving biodiversity in logging operations. Travel by bus to the airport of Turku. Flight to Mariehamn, Åland. Day 4: Sightseeing in Mariehamn. Information about the autonomy of the Åland Islands. Old-growth forest. Forestry on the Åland Islands. Broad-leaved tree species in south-western Finland. Thinning operations. Lunch in Kastelholm Castle. Flight to Helsinki with arrival at 19:00.

Excursion 2. Forestry in the lake district of Pirkanmaa (Tampere–Valkeakoski–Luopioinen–Pälkäne–Tampere–Helsinki), 3 days, August 13-15, 1995, 27 participants. (Leader: Pekka Kauppi). This three-day excursion showed forestry within a lake system in Finland, in Hauho region about 40 km southeast of Tampere. During the excursion, the participants were able to use large rowing boats, made of wood, built according to old local traditions. Forestry issues included landscape management, rural development, nature protection, forestry operations in a vulnerable natural environment, and log transport. Both ancient and modern transport systems were described. In addition, the participants could enjoy rowing the boats themselves, covering a distance of 50 km in three days.

On Sunday, August 13, 1995: Departure from the Tampere Hall straight to the beginning of the route at Lake Kukkia. The first day was devoted to getting used to the boat, enjoying the landscape and receiving general information on forestry and rural development in the Pirkanmaa region. Before dark, setting in a camp in two large field tents in a privately owned family forest by lake. The participants got information about forest vegetation and ownership history of the area as well as current forestry issues as experienced by the forest owner. Day 2: the delegates saw timber transportation operations. The geology and origin of soils in Finland were described. The second camp was located on private land, and the programme theme was the tradition of Finnish farm husbandry of combining forestry with agriculture. On the third day, the route passed a river into Lake Pintele, the least forested of all these lakes. The participants were informed about efforts to

protect the nature there and then rowed and had sightseeing along a large variety of shore land, including historic sites. Conflicts between protection and development of the shoreline were described. The participants had an informal farewell dinner in the medieval Castle of Häämeenlinna, and returned to Helsinki, by the night.

Excursion 3. Wood procurement and forest industries in Finland (Tampere–Orivesi–Jyväskylä–Joensuu–Savonlinna–Helsinki), 6 days, August 12-17, 22 participants. (Leader: Professor Esko Mikkonen). Saturday, August 12, 1995, at 15:00: departure from the Tampere Hall for Korkeakoski by bus. Modern sawmill in Korkeakoski or Vilppula. Energy production from sawmill waste by mobile crasher technology. Field research station of the University of Helsinki at Hyytiälä. On Sunday, August 13, 1995: departure from Orivesi to Hyytiälä. Academic forestry education and college level education of forestry in Finland. Foundations of new forest machine technology. Demonstration of a walking forest machine.

On Monday, August 14, 1995: departure at 07:30 from Jämsä to Jämsänkoski. Vocational training of forest workers, forest machine operators and forest machine maintenance men, visiting the Jämsänkoski Forest Machine School. Harvesting technology and methods of self-employed forest owners. Modern short-wood harvesting of the United Paper Mills pulp and paper company. Truck transportation of wood. Modern wood measurement methods in wood procurement. Wood handling at the pulp mill. World's largest and fastest paper machine in Kaipola. Architecture exhibition in Alvar Aalto, museum in Jyväskylä. Sightseeing tour in Jyväskylä. Next day: departure at 07:30 to Keitele and Äänekoski. Connecting truck transportation and floating of wood. Floating of wood in bundle rafts. Keitele-Päijänne channel cruise. Wood storage in water. Feeding the wood from the water to the processor. Railway transportation of wood. Wood measurement in a railway car. Äänekoski pulp mill. Energy balance of a pulp mill. Modern process of water treatment at the pulp mill. Environmental aspects. Arrival to Joensuu.

On Wednesday, August 16, 1995: departure to the FMG forest machine factory. Manufacturing of short-wood harvesting machinery. Mechanized and manual harvesting from thinning. Multiple tree handling. Transportation of wood in barges in the Lake Saimaa area. Bioenergy use of low value wood for a local heating plant. Farewell dinner at Hotel Herttua in Kerimäki. The last day, departure to Punkaharju. Forest Information Centre and Lusto Museum. The Finnish Forest Research Institute's field station and arboretum. Scenic route of Punkaharju. Museum ship Salama and medieval castle of Olavinlinna in Savonlinna. World's largest wooden church in Kerimäki. The tour ended formally in Savonlinna at 18:00 o'clock. The participants were able to return to Helsinki by the excursion bus at about 23:00 at night, to take a night train with arrival on Friday at 6:30 a.m., or to return on the next day by airplane.

Excursion 4. The mechanical wood industry and its products (Tampere–Lammi–Lahti–Nastola–Mäntyharju–Pellos–Imatra–Lappeenranta–Inkeroinen–Loviisa–Helsinki–Otaniemi–Helsinki), 6 days, August 13-18, 31 participants. (Leader: Professor Risto Juvonen). On Sunday, August 13, 1995: departure at 10:30 from the Tampere Hall by bus to Lahti with visiting Wirebo Oy, Lammi, top quality made-to-measure windows. On Monday, August 14, 1995: the participants visited Isku Oy, Lahti (furniture, particleboard and plywood mills) and Raute Oy, Nastola (processing machinery for mechanical wood industry). On August 15, 1995: demonstration of sawing machine *Hew Saw R 200* production at Veistosaha Oy, Mäntyharju, the newest plywood mill in Finland at Schauman Wood Oy, Pellos, and Olavi Räsänen Oy, Mikkeli, a leading enterprise in pallet and speaker's stand production, as well as parquet production.

On August 16, 1995: an integrated unit for manufacturing pulp, paper, sawn timber and plywood was visited at Kaukas Oy, Lappeenranta, and on the next day: end-use-oriented sawmill production at Enso-Gutzeit, Inkeroinen, and production lines and individual machines for wood-based panel industry at Rauma-Repola Ltd., Loviisa. The last day, Friday, August 18, 1995: the

participants visited the Technical Research Centre and Helsinki University of Technology, Wood Laboratories, Otaniemi as well as the Finnish Forest Industries Federation in Helsinki. The excursion ended at Hotel Grand Marina, Helsinki. During the tour, the accompanying persons had special sightseeing in Lahti, Mikkeli, Lappeenranta and Helsinki.

Excursion 6. Inventory of forest resources and small-scale forestry (Tampere–Jyväskylä–Sysmä–Heinola–Lahti–Helsinki), 3 days, August 13-15, 38 participants. (Leader: Professor Kari Mielikäinen). Departure on Sunday, August 13, 1995, at 10.00 departure from the Tampere Hall by bus, the participants went to the Art Exhibition in Kangasala and then visited forestry and forest management planning unit of a big industrial enterprise. After lunch in the forest, they were acquainted with birch silviculture in Säynätsalo. In the evening, there was a reception by the City of Jyväskylä. Day 2: the delegates visited the forest management planning unit in communal forests in the city of Jyväskylä, and were informed about forest management planning in small-scale private forests and family forestry, planning of forest operations. They were able to enjoy a country meal. On August 15, 1995, there was a demonstration of growth and yield studies in the Experimental Forest of Nynäs: (a) The effect of nitrogen (fertilization or deposition) on the forest, (b) Thinning experiments of Norway spruce, (c) Methods and equipment in yield studies, and (d) Girth bands in measuring tree growth during the vegetation period. After lunch in the Congress Centre Fellman in Lahti, the participants were informed about Finnish National Forest Inventory, visited the home of Jean Sibelius in Järvenpää and the home and Art Exhibition of Pekka Halonen. The excursion ended upon arrival at 17.00 at Helsinki-Vantaa Airport.

Excursion 7. Genetic resources and forest regeneration material (Tampere–Jämsänkoski–Jyväskylä–Saarijärvi–Varkaus–Punkaharju–Imatra–Helsinki by chartered bus), 5 days, August 12-16, 1995, 30 participants. (Leader: Dr. Veikko Koski). On Saturday, August 12, 1995, at 14:00, departure from the Tampere Hall for Jämsänkoski where the participants were informed about gene conservation and response to climate change. On August 13, 1995: they visited seed orchards of *Larix sibirica* and *Picea abies*, a primeval forest and were acquainted with field trials and industrial use of *Betula pendula*. After spending overnight in Saarijärvi, on August 14, 1995, the group visited the forest tree seed centre, familiarized with field tests with micro-propagated birch, visited a seed orchard of *Betula pendula*, paper mill and Mechanical Music Museum in Varkaus where they stayed for overnight. On August 15, 1995, the participants could see a seed orchard of *Pinus sylvestris*, nature of a lake area, progeny test orchard area, genetic studies, Lusto Finnish Forest Museum in Punkaharju. After visiting the Punkaharju Research Park and Retretti Art Centre, on Wednesday, August 16, 1995, the participants returned to Helsinki (350 km) via Punkaharju, Imatra and Kouvola.

Excursion 8. Forestry and Nature Conservation in the Lake District of Saimaa (Tampere–Savonlinna–Punkaharju–Imatra–Helsinki), 4 days, August 12-15, 1995, 36 participants. (Leader: Kari Pelkonen). On Saturday, August 12, 1995, at 14:00: departure from the Tampere Hall for Savonlinna by bus, and welcoming dinner in the Olavinlinna Castle, Savonlinna. On August 13, 1995: stopover in the Visitors Centre of Linnansaari, National Park in Rantasalmi, sightseeing from the boat in the National Park (getting acquainted with the park management), visit to the Rauhanlinna Villa Museum. On August 14, 1995, the participants visited the Savonlinna Provincial Museum where they could see old lake steamers and enjoy a trip of about 30 km by the Savonlinna steamerto Lake Pihlajavesi with demonstration of integrated nature conservation, recreation and commercial use in the lake archipelago. It was followed with a discussion of small-scale family forestry and waterway wood transportation and a visit to the Lusto Forest Museum in Punkaharju. On Tuesday, August 15, 1995, the participants were acquainted with forest research activities of the Punkaharju Research Station, Finnish Forest Research Institute, and management of the Punkaharju Nature Conservation Area, and at noon, they departed to Helsinki by bus.

Excursion 10. Forestry and forest research; north of the Arctic Circle (Tampere–Rovaniemi–Kittilä–Kolari–Muonio–Enontekiö–Skibotn (Norway) –Kittilä), 6 days, August 12-17, 1995, 23 participants. (Leader: Martti Varmola). On Saturday, August 12, 1995, at 15:00: departure from the Tampere Hall, flight from Tampere to Rovaniemi. On Sunday, August 13, 1995, the Congress participants visited the Arctic Centre, University of Lapland and the Provincial Museum of Lapland's exhibition, logging operations at Meltaus, near Rovaniemi, and the Reidar Särestöniemi Art Gallery, Kittilä.

On August 14, 1995, the group examined forest pests at the Levi Fell and Sätkenä gene reserve forest in Kittilä, and Yllästunturi Visitor Centre and the gorges of Yllästunturi, Kolari. Next day, the participants were acquainted with multipurpose family forestry at the Rauhala farm, Kittilä, reindeer husbandry and reindeer research at Torassieppi, Muonio, visited the Pallas-Ounastunturi National Park; Pallastunturi Visitor Centre and the Global Atmosphere Watch Program at Pallastunturi in Kittilä.

During the next day, the points of interest were demonstration of population cycles of small mammals in the boreal taiga and biodiversity and threatened species in boreal forests at Pallastunturi, Kittil; the Fell-Lapland Nature Centre, Hetta, Enontekiö and timberlines and treelines in northern Finland, Enontekiö. The participants enjoyed a boat trip on Lake Kilpisjärvi, and Finnish sauna.

On the last day, Thursday, August 17, 1995, the group crossed the Finnish-Norway border to see the Arctic Ocean, birds of the Arctic and Palsa mires at Peera, Enontekiö. At about 19:00, they arrived at the Rovaniemi airport for return.

Excursion 11. Protection and multiple use of the natural resources in Finnish Lapland (Tampere –Rovaniemi–Kemijärvi–Sodankylä–Ivalo–Utsjoki–Karigasniemi–Angeli–Ivalo). 6 days, August 12-17, 1995, 32 participants. (Leader: Pentti Sepponen). On Saturday, August, 12, 1995: Departure from the Tampere Hall at 15:00, flight from Tampere to Rovaniemi. Upon arrival, the participants enjoyed Rovaniemi sightseeing, including the Arctic Circle. On August 13, 1995, the group visited the Arctic Centre and was familiarized with the research of the nature and the cultures in the arctic; forestry and nature conservation in Finnish Lapland; Finnish nature conservation system and in the evening, they visited the Pyhätunturi Nat'l Park.

On August 14, 1995, the group visited a private forestry unit in Finnish Lapland; a forestry enterprise on state-owned land in Finnish Lapland; the Urho Kekkonen[260] National Park and Gold Museum; it was also acquainted with land use planning and environmental effects of the Saariselkä tourist centre. On August 15, 1995, the participants visited the Saariselkä recreation area; and the Urho Kekkonen National Park; they were informed about reindeer husbandry in Finnish Lapland; the Park and Forest Service in Finnish Lapland; management and planning of wilderness areas, wilderness research in Finland, and other attractions of Finnish Lapland.

On August 16, 1995, the group visited the Saami Museum, Artisans Workshop, and Kevo Subarctic Research Station; experienced outdoor recreation in the surroundings of Inari village and Saami culture. On the last day, August 17, 1995, the participants saw the timberline and a pine plantation north from the timberline, a pine forest in Kaava, Atlantic salmon fishing and the River Teno, and at 19:00, they arrived to the Rovaniemi airport to go back.

International excursions:

Excursion 12. Broadleaved forest management for multiple use: Deciduous forestry and multiple use in Sweden and Denmark Energy Forestry in Finland and Sweden (Tampere–Inkoo–Pohja–Turku–Stockholm, Sweden–Visingsö–Jönköping–Växjö–Råshult–Kristianstad–Ryssberget–Hörjtel–Malmö–Copenhagen, Denmark), 6 days, August 13-19, 1995, 19 participants. (Leader:

[260] Urho Kaleva Kekkonen (1900-1986) is well-known Finnish politician, Prime Minister of Finland (1950-1956), the eighth longest-serving President of Finland (1956-1982).

Professor Veli Pohjonen). Departure on Sunday, August 13, 1995, at 8:00 from the Tampere Hall for Inkoo by bus. In Inkoo, the host – Imatran Voima Ltd - organized a visit to an energy willow plantation, and in Turku, they visited the Turku castle and had sightseeing in Old Turku. Then, the participants took an overnight ferry to move from Turku to Stockholm.

On Monday, August 14, 1995, the host, Svenska Jägarförbundet (the Swedish Association of Hunters) showed local game species, hunting opportunities and faunal damages to deciduous trees. Then, Assidomän (another host organization) demonstrated oak forest management in Visingsö; and offered a tour to Visingsö Castle. On August 15, 1995, the Swedish Forest Agency (at Jönköping) demonstrated Swedish forestry practices and deciduous trees. The Southern Association of Forest Owners (also a host organisation) demonstrated deciduous trees in South Swedish forestry in the Växjö region, and in Råshult, they showed a deciduous forest, maintenance of biodiversity and ecological stability, and Carl von Linné's birthplace.

On Wednesday, August 16, 1995, Trolle Ljungby Gods as the host organization, demonstrated an extensive, nature-based model for economical silviculture of beech in Ryssberget; Hörjels stiftelse (the host) informed the group about the role of deciduous trees in former traditional agriculture in Hörjel, and the Swedish University of Agricultural Sciences (the host) showed energy forestry in Southern Sweden. On August 17, 1995, the participants took a ferry to Denmark from Limhamn to Dragör (having lunch on board). In Kongelunden and West-Amager, they were familiarized with deciduous trees and recreation, afforestation with deciduous trees on the urban fringe and deciduous trees in a reclaimed nature reserve area Copenhagen. In the evening, the group visited the Copenhagen entertainment park. On the final day, August 18, 1995, the participants saw afforestation with deciduous trees on the urban fringe for recreation, afforestation and broadleaved management in the Deer Park, and visited the Arboretum. A farewell party took place at the Danish Forest and Landscape Research Institute. On the next day, August 19, 1995, the participants could travel from the Copenhagen airport anywhere.

Excursion 13. Forestry and rural development in Nordic countries (In Finland: Tampere–Urjala –Turku; in Sweden: Stockholm–Sala–Garpenberg–Torsby; in Norway: Elverum–Lillehammer–Gausdal–Oslo), 6 days, August 12-17, 1995, 37 participants. (Leader: Rihko Haarlaa). Departure on Saturday, August 12, 1995, at 14:00: departure from the Tampere Hall for Urjala, by bus. On the way, the group visited to a tenant habitation and a modern farm and got acquainted with a modern farm with multiple goals as well as research and development in improving a farmer's work in forestry. Dinner was served at the Turku medieval castle. On August 13, 1995, at 08:30: Departure from Turku for Stockholm, by ferry. There was a seminar on private forestry and rural development during the trip and after the arrival at Stockholm, the group went to Sala by bus.

On Monday, August 14, 1995, at Sala, the participants heard a presentation of the Regional Forest Owners Association (Mälarskog) and travelled to Sätra Brunn to visit a logging crew of private forest owners. Upon return to Sala, they visited the old Sala silver mine. After lunch, the group travelled to Garpenberg, where it heard a presentation of the Swedish University of Agricultural Sciences (SUAS) in Garpenberg and an introductory lecture about research in small-scale forestry. There was a demonstration of equipment for private forestry and a visit a small crayfish farm at Horndal.

On August 15, 1995, at Hedemora, the participants were acquainted with energy and rural development, visited Salix plantations, and saw planting and harvesting machines for energy forests. After lunch, they travelled to Ekshärad to visit a small private sawmill. On the next day, the group departed from Torsby for the border between Norway and Sweden, visited Stiftelsen Finnskogen, a rural development scheme, and saw forest operations and environmental protection activities. Later, at Elverum (Norway), the tourists heard a presentation at the Forestry Museum where a farewell party was organized.

On August 17, 1995, the group travelled to Hamar where they heard a presentation about forestry and cooperation among small forest owners at the Northern Light Hall, then they went to Gausdal near Lillehammer where the Forest Owners Association made a presentation about the extension service, and after lunch at a farm in Gausdal, the participants were acquainted with the rural development policy in Norway and farm tourism. After visiting a local sawmill, using local timber at Gausdal Bruk, the group travelled to the Oslo Fornebu airport for departure.

Excursion 14. Forestry and biodiversity (Tampere–Vaasa–Umeå, Sweden–Mo i Rana, Norway, –Umeå, Sweden), 7 days, August 12-18, 1995, 16 participants. (Leader: Dr. Liisa Saarenmaa). The major idea of the trip was to show intensive forest management and biological diversity of Nordic countries: Ecologically sustainable forestry in boreal regions, from the coastal lowlands in western Finland, across the Gulf of Bothnia, through wilderness areas in Swedish Norrland, over the alpine tundra of the Scandinavian Mountain Ridge, to the Rana Fiord on the Atlantic coast in Norway, back to Sweden and on to Arjeplog, Arvidsjaur and Skellefteå. On the way, the participants could enjoy the Nordic scenery and forests, Vindelfjällen Nature Conservation Area, Museum of Forestry at Lycksele, etc.

On Saturday, August 12, 1995: departure at 15:00 from the Tampere Hall for the Hyytiälä Forestry Field Station, University of Helsinki, where the participants were informed about old growth forests in Susimäki, remote sensing to monitor biodiversity, and biodiversity assessments, using light traps. On August 13, 1995, the Swedish Forest Agency Office in Umeå (Sweden) hosted the excursion and informed the group about planning models for forestry based on ecological principles at the landscape level, about mapping of woodland key habitats, and about old growth forests near Lycksele.

On Monday, August 14, 1995, they had an excursion to a clear-cutting area, heard a presentation about policies for sustainable forestry and biodiversity, and visited the Nature Conservation Area of Vindelfjällen, Kirjesålandet, spruce dominated old growth forests. On August 15, 1995, the Norwegian part of the trip was meant to demonstrate forestry and its meaning to local people, the northernmost natural spruce forest in the Norwegian Arctic Circle, genotypes and environmental factors in spruce forests in Norway. Then, the participants arrived at Lonsdal.

On August 16, 1995, the group visited the nursery in Storjord (Norway), and was informed about the survival of tree seedlings in northern conditions, and visited the Silver Museum in Arjeplog (Sweden). On the next day, the participants were informed about forestry in Norrbotten, forest management planning with GIS and the multiple-use approach, survey of key biotopes and wetlands, recovery of a depleted forest area, and the effect of forest fires. After that, they visited the Suorke Nature Reserve where they were informed about the Harvesting Schedules of today, and the AssiDomän (now Sveaskog) Balance of Ecological Accounts. After spending overnight at Skellefteå, on Friday, August 18, 1995, the group departed for the Umeå airport for the return flight.

Excursion 15. Kola excursion through Finnish Lapland and Northeastern Norway to the Kola Peninsula (Tampere–Rovaniemi–Ivalo–Kirkenes, Norway–Nikel, Russia–Murmansk–Apatity–Kandalaksha, Russia, –Salla–Rovaniemi, Finland), 8 days, August 12-19, 1995, 19 participants. The main objective of the trip was to give an idea of the ecology of the arctic and alpine timberlines and effects of air pollution on northern forest ecosystems, the work and research in an arboretum of northern coniferous tree species, field studies to assess the effects of air pollutants and heavy metals on the ground vegetation and water, visual consequences of abiotic and biotic forest damage, composition and conditions of arctic and alpine vegetation, reindeer husbandry, and presentation of the research activities of the Kola Science Centre of the Russian Academy of Sciences (Apatity). Cultural and traditional points of interest were the Arctic Circle, Santa Claus Village (Rovaniemi, Lapland Finland), the Arctic Centre and the Provincial Museum of Lapland, gold panning, Atlantic salmon, Lappish (Saami) culture, etc. On August 19, 1995, the tour ended at the Rovaniemi Airport.

Excursion 17. Forest Excursion to St. Petersburg (Tampere–Lappeenranta–Vyborg, Russia–St. Petersburg, Russia–Helsinki), 6 days, August 12-17, 1995, 29 participants. (Leader: Professor Eino Mälkönen). Departure on Saturday, August 12, 1995, at 14:00 from the Tampere Hall for Lappeenranta by bus via Hämeenlinna and Lahti. On the way, the participants visited a private forest farm, and spent overnight in Lappeenranta. On August 13, 1995, the group crossed the Finnish-Russian border and visited the historical larch plantations from the 18th century, and in the afternoon, they had a sightseeing tour in St. Petersburg.

On August 14, 1995, they visited forest plantations on drained peatlands, the Lisino Educational Experimental Forestry Enterprise of the St. Petersburg Forest Technical Academy, and the Lisino Forest College, and the cultural program included a visit to at the Palace Park of Pushkin near St. Petersburg. On August 15, 1995, there was a field excursion to the Siversk experimental forestry area of the St. Petersburg Forestry Research Institute to see stand establishment, density of plantations, and thinning operations.

On August 16, 1995, they had a sightseeing tour in the city of St. Petersburg and visited the Hermitage. In the afternoon, the St. Petersburg Forest Technical Academy briefed them about forest research and education. In the evening, the participants went to the theatre. On August 17, 1995, they visited the recreational forest park of Novo-Kavgolovo. The group could see the forests in the Russian-Finnish transboundary region. In the evening, the participants arrived to Helsinki.

In should be mentioned that this route was prepared by the St. Petersburg Forestry Research Institute with inputs from the St. Petersburg Forest Technical Academy and the Government of the Leningrad Oblast. A booklet had been prepared to describe the demonstration sites (Наука и ведение лесного хозяйства 1995).

Excursion 18. Forestry in the changing socio-economic conditions of the Baltic countries (Tampere–Helsinki–Tallinn and Tartu, Estonia –Sigulda, Riga and Salasspils, Latvia – Birzai and Kaunas, Lithuania), 6 days, August 12-17, 1995, 34 participants. Departure on Saturday, August 12, 1995, at 14:00, from the Tampere Hall by bus for Helsinki, and then by ferry for Tallinn. The main objective was to show the green zone and recreation opportunities in Estonia, its Lahemaa National Park with experimental forests, traditions and culture, the University of Tartu, private forestry and sites and studies of landscape protection. In Latvia: high-quality stands of indigenous species, forest management in wet areas, afforestation of sand dunes, nature conservation and management methods in protected areas and forestry on private lands. In Lithuania: mixed forest stands, regeneration, thinning, shelterwood cutting and sawmilling at the Birzai Forest Enterprise; experiments with spacing, mixed plantations, seed orchards, virgin forests and continuous inventories at the Lithuanian Forest Research Institute, Kaunas. The participants could also admire the beauty of Tallinn, Tartu, Riga and Kaunas, visit the Forest Museum, a fishing village, the Gauja National Park (Latvia), Birzai Castle (Lithuania), National Art Gallery, and enjoy traditional food, folk music and dancing. The excursion ended in Kaunas on August 18, 1995, but participants who wanted to return to Tallinn could do it as a bus was arranged.

Russian participation

Russia was represented by 44 people: Nikolai Andreev, Eduard Davidenko, Moiseev Nikolay, Anatoly Pisarenko, Victor Teplyakov (Federal Forestry Service of Russia); Yuri Baranchikov, Igor Danilin, Valentin Furyaev, Galina Ivanova, Iraida Tretyakova (Institute of Forest, Siberian Branch, RAS); Victor Bolondinski, Leo Kaipiainen, Vitali Krutov, Tatjana Sazonova, Galina Sofronova (Forest Research Institute of the Karelian Centre, RAS); Anastasya Butorina (Research Institute of Forest Genetics and Breeding); Nickolai Burdin (NIPIEILesprom); Oleg Kharin, Alexei Kirillov, Nikolai Kojoukhow, Elena Kulikova, Ekaterina Mozolevskaya, Alexandre Oblivin, Irina Rykunina, Valentin Shalaev, Vasiliy Vagin (Moscow State Forest University);

Gennadiy Velikanov (Forest Committee for the Leningrad Oblast); Stanislav Vompersky (Forest Institute, RAS); Vladislav Vorobjev and Nina Vorobjeva (Institute for Ecology of Nature Complexes, Tomsk); Svetlana Dmitrieva (Forest Industry Magazine); Alexander Isaev (International Forest Institute); Irina Kravkina (Komarov Botanical Institute, RAS); Pavel Krestov (Institute of Biology and Soil Sciences, RAS, Vladivostok); Vyacheslav Nikonov (Institute of North Industrial Ecology Problems, RAS, Apatity); Vladimir Pakhutchij (Institute of Biology, Komi Science Centre, RAS); Anatoly Petrov (Russian Institute of Continuous Education in Forestry); Valery Putenikhin (Botanical Garden, Institute, Ufa Science Centre, RAS); Stakhiev Yury (TsNIIMOD); Valentin Strakhov (Russian Research and Information Centre for Forest Resources); Valadimir Usoltsev (Forest Institute, RAS, Yekaterinburg); Dolgor Khaidarova (Moscow State University); Andrey Chmyr (St. Petersburg Forestry Research Institute); Vladimir Jagodin (St. Petersburg Forest Technical Academy).

Thus, the delegation included representatives of: forest administration (6 persons), academia (17 people), applied forest research and vocational education (6 persons), universities (11 people), other research organizations (3 people), and one journalist from the forest sector journal (*Lesnaya Promyshlennost*). Academician N. Moiseev could be included in any of the above mentioned groups.

Russian scientists submitted 66 reports, including 35 posters, covering results of their research in such areas as forest fire control, timber inventory, forest monitoring, urban forestry, forestry of economies in transition, remote sensing technology, etc. Several papers were prepared in co-authorship with foreign colleagues mostly from the USA (M. McFadden, S.G. Gonard, J.C. Regelbrugge, T.W. Swetnam, C.H. Baisan), Canada (D.R. Cahoon, B.J. Stocks, B. Lawson), Germany (J.G. Goldammer), Finland (E. Malkonen), Sweden (P. Angelstam) and Latvia (G. Dobele, T. Dizhbite, and U. Viesturs). These contributions are listed below as invited papers:

1. Bobkova, K.S., Tuzhilkina, V.V., Zagirova, S.V. and Kuzin, S.N. Bioproductivity process in northern forest ecosystem;
2. Butorina, Anastasiya and Evstratov, Nicolai. Amitosis in Pine as a Result of Chronic Effects of Low Doses of Radiation and Chemical Pollution;
3. Danilin, I.M. Ecological State of Forests in Central Siberia;
4. McFadden, M. and Vaganov, E. Sustainable Forestry in Central Siberia: A Russian-American Cooperative Effort;
5. Furyaev, Nicolai V., Ivanova Galina A. and Per Angelstam. Ecology of the Forests of the Sym Plain, Krasnoyarsk Territory, Siberia;
6. Gonard, Susan G., Ivanova, Galina A., Furyaev, Valentin V. and Regelbrugge, Jon C. Post-Fire Tree Mortality and Insect Investigation in *Pinus Sylvestris* on Bor Forest Island, Krasnoyarsk Region, Siberia;
7. Gorshkov, Vadim V., Irene Bakkal and Stavrova, Natalie I. Post-fire Recovery of Subordinate Layers and Litter in Scots Pine Forests of the Russian North;
8. Gorshkov, Vadim V. and Stavrova, Natalie I. Regularity of the Scots Pine Renewal Dynamics During Recovery of the Northern Taiga Pine Forests After Fires;
9. Ivanova, Galina A. and Eino Malkonen. Pre-fire Vegetation, Forest Stand and Site;
10. Kozybov, Gennady, Artyomov, V. and Tarbaeva, V. Cytogenetic Investigations of *Pinus sylvestris* under Radiation Influence from the Chernobyl Nuclear Power Station Accident;
11. Krestov, Pavel. Phytocenotic Diversity of the Broad-Leaved Korean Pine Forests of the Russian Far East;
12. Kukelev, J., Kulikov, M. and Kukolev, M. Research of Machines Thermal Modes;
13. Kulikova, Elena G. Insect and Diseases Complex in Moscow Urban Areas;
14. Kuznetsova, Nina. Some Ultrastructural Aspects of Inbreeding Depression in Scots Pine (*Pinus sylvestris* L.);

15. Mashkina, Olga and Butorina, Anastasiya. Cytological Mechanisms of Unreduced Microspore Formation in Tree Species;
16. Moiseev, Nickolay A. The Economic Theory of Decision-Making in Forestry: Historical Aspects;
17. Mozolevskaya, Ekaterina G. A Forest Monitoring method for Stand Condition Estimation;
18. Muratova, Elena. Karyological Diversity in Representative Species from Pinaceae;
19. Muraya, Lidiya and Isakov, Yury. Influence of Open- and Self-Pollination on the Functional State of Nuclear Organizers in *Pinus sylvestris* Progeny;
20. Petrov, Anatoly P. Development of Property Rights in Forestry in the CIS at Transition Period;
21. Pleshikov Fedor, Tcherkashin Vyacheslav, Kalashnikov Eugeny, Ryzkova Vera and Kaplunov Vladimir. Man-Caused Transformation of the Productivity Process in the Forests of Middle Siberia;
22. Putenikhin, Vladimir P. and Karmysheva, N.I. Population Structure of Siberian Spruce (*Picea obovata* Ledeb.) in the South Urals;
23. Salminen, E.O. and Tjurin, N.A. Climate Influence on Logging Plan;
24. Sennov, Svetosar N. Growth Trends of Pine and Spruce Stands in North-West Russia;
25. Shalaev, Valentin S. About Forest System Research in MSFU;
26. Stocks, B.J., Korovin, G.N., Sukhinin, A., Cahoon, D.R. and Goldammer, J.G. Forest fire occurrence in the Russian Federation and Canada: Ground, aerial and satellite measurement;
27. Stocks, B.J., Lawson, B. and Valendic, E. Fuels and Fire behaviour of the Bor Forest Island Fire;
28. Swetnam, Thomas W., Baisan, Christopher H. and Ivanova, Galina A. Fire History of Bor Forest Island and Surrounding *Pinus Sylvestris* Forests of the Dubches Plain, Siberia;
29. Vorobjev, Vladislav N., Vorobjeva, Nina A. and Goroshkevich, Sergey N. Relationship Between Growth and Generative Development in *Pinus sibirica*: Morpho-Physiological Regulatory Mechanisms and their Use for Selection and Control of Reproductive Processes;
30. Voronkov, Poitr T. Practice of Economic Valuing Forest Resources in Russia;
31. Yarmishko, Vasiliy. Growth and Productivity of Pine Forests Under Environmental Changes in the North of European Russia; and

Posters:

32. Ananyev, Vladimir and Poluboyarinov, Oleg. Increment and Quality of Wood in Drained Spruce Forests;
33. Baranchikov, Yuri N. Larch Bud Gall Midge. The Major Problem for Commercial Larch Seed Production in Russia;
34. Dobele, G., Bogdanovitch, N., Telysheva, G., Dizhbite, T. and Viesturs, U. High Efficient Carbon Sorbents on the Basis of Wood Waste;
35. Fedorkov, Aleksei L. Microsporogenesis, Male Flowering and Seed Development of Scots Pine Trees under Pollution;
36. Khaidarova, Dolgor, Karpachevsky, Lev and Voronin, Anatoly. Water Regime and Wood Increment of Forest Shelterbelts in the Dry Steppe Zone;
37. Kharin, Oleg A. A System of Control of Forest Resources Use and Reproduction in Russian Taiga;
38. Kobak, K.I. Net Ecosystem Productivity in Forests;
39. Kondrasheva, N.Yu. Possible Changes in Carbon Content of Forest Pool of Russia with the Global Warming;

40. Koshkarova, Valentina L. The Response of Taimyr Forest Vegetation to Global and Regional Climate Change During the Last 10,000 Years;
41. Kozhukhov, Nickolai. Formation of Market Infrastructure of Forest Industries in Russia;
42. Kravkina, Irina M. Effect of Atmospheric Pollutants on the Dynamics of the Main Cell Organelles of Leaves of Forest Plants;
43. Krutov, Vitali I. Phytopathological Problems in Forest Artificial Regeneration in the Karelia-Kola Region of Russia;
44. Kuzmina, Nina. Provenance Trial of *Pinus sylvestris* in Siberia;
45. Kuznetsova, Galina. Provenance Trial of *Pinus sibirica* Du Tour and *Pinus koraiensis* Siebold et Zucc. in Siberia;
46. Larionova, Albina. Genetic Variation of Several Conifer Species in Siberia;
47. Milyutin, Leonid. Larch Provenance Trial in Siberia;
48. Muratova, Elena. Karyological Diversity in the Pinaceae;
49. Nedorezov, Lev V. Classification and Use of Phase Portraits to Forecast the Population Dynamics of Outbreak Species;
50. Pakhutchij, Vladimir. Species Composition, Stand Structure and Size Distribution of Trees in the Virgin Forest, Komi Republic;
51. Pitukhin, Alexander. Design and Investigation of the Russian Timber Tractors;
52. Sannikov, Stanislav. Cenogeographic Regularities in the Natural Regeneration of Scotch Pine;
53. Sannikova, Nelli. Quantitative Microecosystematic Analysis of the Structure and Natural Regeneration of Tree Cenopopulations;
54. Sazonova, Tatjana A. and Bolondinsky, Victor K. Water and CO2 Exchange of Scots Pine is Affects by Industrial Pollution;
55. Schepaschenko, Dmitriy G. Larch Productivity on Different Soils in the North-East of Yakutia;
56. Selikhovkin, Andrey V. and Musolin, Dmitri L. Population Density Dynamics of Leaf-Mining Insects in Areas of Air Pollution;
57. Senkevich, Serguei M. Short- and Long-Term Natural Trends of Pine Radial Growth in North- and Middle Taiga-Forests in Karelia;
58. Shibistova, Olga, Shein, Igor and Zrazhevski, Galina. Phenolic Metabolism of *Fusarium* Wilt Resistant Scots Pine Seedlings;
59. Soloviev, V. and Senkevitch, L. Research on the Wood Cutting Process at Archangel Engineering University;
60. Stakhiev, Yury M. and Ershov, Sergey V. The Circular Saw Universal Rotation Speed, What Is It?;
61. Storozhenko, Vladimir G. Wood-Destroying Fungal Infection of Primeval Spruce Forests in Various Forest Belts of the European Russia;
62. Tretyakova, Iraida and Bazhina, Elena. Problem of Fir Decline in Siberia. The Reproductive Processes;
63. Vagin, Vasiliy A. Natural Mortality of Spruce Stands in Moscow Region;
64. Veretennikov, Anatoly V., Kortchagin, O.M., Odintsov, A.N. and Popova, V.T. Ecological and Physiological Behaviour of Black Locust, Green Ash and Scots Pine Seedlings in Controlled Stress Conditions;
65. Vorobjev, Vladislav N. and Vorobjeva, Nina A. Study of Morphophysiological Factors of *Pinus sibirica* Flowering;
66. Yakimenko, Helen and Shibistova, Olga. The Use of Microbial Antagonism for Scots Pine Seedling Damping-Off Protection: *Trichoderma viride*.

Interesting facts

The Congress included both commercial and non-commercial exhibitions, and a special exhibition, dedicated to the history of IUFRO, as well as organized planting of a new urban park (IUFRO-95 Park), where a tree was planted by each participating country.

The Congress participants saw an experimental prototype of the walking harvester. Its distinguishing feature was the ability to move on six metal legs instead of wheels or tracks. It was designed in 1994 by the Plustech Oy Company. For the first time, a competition of posters was held during the Congress for each Division[261].

The first website [262] was opened for the Congress to publish various documents and information. In fact, the experience was useful for the development of electronic communication, introduction of a paperless workflow and use of the Internet in forest research. Numerous publications and valuable information was available free of charge at the IUFRO website. The IUFRO web page provided a lot of useful information, including administrative and scientific, journalistic information (news and IUFRO News), calendars of events, etc.

The Congress was covered by 101 Finnish and 17 foreign journalists, 20 television and radio programs; about 430 articles were published.

The Congress considerably enhanced its importance in the eyes of scientists from different countries and the international forest community and showed the growing interest in forest research; the number of its participants was comparable with, if not surpassing the number of participants of the World Forestry Congress, held under the auspices of the FAO for all forestry and timber sectors of the global economy. Selected events were also targeting a wide range of people and policy-makers in different countries. In particular, such meetings were purposefully organized for different groups to demonstrate various technical, technological and scientific solutions (Вагин и др. 1996).

It was a common practice to hold scientific symposiums under the aegis of IUFRO before and after the Congress, and the number of such events reached an average of 60 per year. Much work was done by IUFRO in E. Europe and former Soviet Republics to share scientific ideas and experiences.

In Finland itself, prior to the Congress, two international meetings were held in Joensuu; these were directly associated with IUFRO, but most of their participants were from its member institutions. Those were the conference on Climate Change, Biodiversity and Boreal Forest Ecosystems (July 30 – August 5, 1995), organized by the International Boreal Forest Research Association (IBFRA) in collaboration with Finnish colleagues (IBFRA 1995); and the international workshop on Electronic Information Resources in Forestry and Environmental Sciences (August 1-5, 1995), sponsored by the European Forest Institute, IUFRO Working Party S4.11-03: Knowledge Management and IUFRO Subject Group S6.03-00: Information Systems and Terminology.

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The 15-year period leading up to the Tampere Congress in 1995 was marked with many important events in IUFRO's life, and globally. During this period, the first IUFRO Congress was hosted by a socialist country and the first IUFRO Presidents from socialist and developing countries were elected. Another event was celebration of 100th anniversary of the Union in the united Germany, in the home of IUFRO at Eberswalde, after the collapse of the socialist system.

In 1991-1993, new members joined IUFRO after the disintegration of the Soviet Union and

[261] The experience was successful, and in 2000, IUFRO introduced a special prize - the Best Poster Award.
[262] http://www.iufro.org/events/congresses/1995/ The experience was successful, and all subsequent Congresses followed it.

Yugoslavia which led to the emergence of new States in Europe and Asia; in 1991, the UN had 166 member states, and the number increased to 179 in 1992, 184 in 1993 and to 185 in 1994 (UN 2014).

The energy crisis and tropical deforestation were the main topics of IUFRO research, especially in developing countries where the bulk of domestically consumed wood was used for fuel. The paradigm shift in forest research was reflected in the Resolution of the Congress in Ljubljana: "Based on research results, published by one of its Working Parties, SO_2 and HF concentration limits were defined and later used in national legislations in Europe to protect the environment and to counteract the forest decline. This clearly shows that IUFRO became a serious source of advice, consultancy and information for governments and society as a whole. Subject-related research lost some of its importance and dominance while project-oriented research increased" (Schmutzenhofer 1998, p.10).

In Strasbourg, in 1990, the Ministerial Conference on the Protection of Forests in Europe (MCPFE) was held for the first time, and in 1993, the second one was held in Helsinki. If the Strasbourg Conference outlined the range of the issues to be addressed, the Helsinki Conference was held in a new geopolitical situation, developed, among other things, under the influence of the Rio Conference and its documents. IUFRO took an active part in these historical meetings of geopolitical significance, which, in turn, strongly influenced the environmental agenda of the Union.

It should be noted that IUFRO as a whole and its member institutions were actively involved in the international forest processes. It was not a coincidence that the Resolutions of the IUFRO Congresses of 1986, 1990 and 1995 contained recommendations and proposals to address the most pressing geo-ecological and regional issues. In particular, it was very vividly reflected in the recital of the Congress in Ljubljana, as well as in the title of the Congress in Helsinki: *Caring for the Forest: Research in a Changing World*, which urged the scientific community to clearly articulate forest science achievements in the political arena, and to convey the importance of forests and forest research to decision makers.

In his welcome address at the IUFRO World Congress in Tampere, President Salleh said: "Started by 4 institutions in 1892, IUFRO now has 719 member institutions in 115 countries. This is an increase from 688 members at the end of 1990. However, membership from developing countries has not increased significantly. Over the last 5 years, IUFRO members held a total of 240 meetings, excluding this Congress, in 51 countries, with the United States, Germany and France hosting over 20 meetings each. It is encouraging to note that out of the 51 countries, 29 are developing countries, of which 15 are tropical countries. This is an encouraging trend…" (IUFRO 1995b, p.44-45).

Chapter 27
Congress XXI – August 7-12, 2000, Kuala Lumpur, Malaysia

This Chapter is based primarily on documents of the 21st IUFRO World Congress (IUFRO 2000 a-h), as well as on information from personal archives and memoirs of the authors who participated in the Congress.

Overview

Symbolically, the 21st IUFRO World Congress was held at the turn of the 21st century under the title: *Forests and Society: The Role of Research*. It was the second IUFRO Congress held in Asia, but the first one, held in a developing country (Malaysia). The Congress was attended by 1,906 participants and 209 accompanying persons from 96 countries (IUFRO 2000d, p.3). The Russian Federation was represented by 44 participants, including one from Sweden, who was working in Russia at the time (IUFRO 2000d).

The agenda included 179 technical and business meetings where 1,146 papers and posters were presented. Its participants could choose from 9 in-Congress and 12 post-Congress excursions in 4 countries. Prior to the Congress, three volumes of the Proceedings were published: full presentations at the sub-plenary sessions, abstracts of group meetings, and abstracts of posters (IUFRO 2000a-c). After the Congress, the fourth volume with the Congress Report was published (IUFRO 2000d).

The World Forestry Exhibition was held on August 7-9, 2000, at the Putra World Trade Centre. The exhibition was jointly prepared with private event organizers in conjunction with 21st IUFRO World Congress. A total of 42 organizations from 14 countries participated in the exhibition; they represented the private sector, government institutions and non-government organizations. The exhibition demonstrated various aspects of forestry and forest industries in terms of new products, publications, research findings and conservation activities, and it was open to the general public.

As of the time of the Congress, IUFRO consisted of 683 organizations from 108 countries in the nine geographical regions with 13,000 scientists represented in the 8 Divisions, 65 research groups, 203 working parties, 8 Task Forces, SPDC and 1 project (IUFRO 2000d, p.189). There were 736 officers/coordinators and their deputies from 67 countries. Almost 20% of the officers were from the USA (141 persons), Canada (49), Japan (40), Finland (37), Australia (35), Germany (34), Sweden (33), France (32), India (29), Austria (24), Malaysia (23), China (21), Italy (20), Poland and Great Britain (19), Chile (13), Denmark (11), Costa Rica (9), Norway (9), Russia (7), Ghana, Belgium, the Republic of Korea and Slovakia (6 officers from each), etc.

Scientific program

The theme of the 21st IUFRO World Congress went through all discussions at the Congress sessions and excursions. The Program included Special Plenary Sessions, organized by the Congress Steering Committee, scientific sub-plenary sessions, organized by IUFRO Divisions and Task Forces (TFs), and group sessions, organized by IUFRO Divisions, Research Groups (RG), Working Parties (WP) and TFs.

On August 7, 2000, the Congress began with welcome addresses by Abdul Razak Mohd. Ali, Chairman, Steering Committee; Jeff Burley, IUFRO President; Mahathir Bin Mohamad, Prime-Minister of Malaysia (his welcome address was read by Dr. Lim Keng Yaik from the Ministry of Primary Industry); Hosny M. El-Lakany, FAO Assistant Director-General, Forestry Department.

At the Opening Ceremony, IUFRO Honorary Membership was granted to two distinguished scientists: Professor Dr. Franz Schmithüsen, Switzerland, Swiss Federal Institute of Technology (ETH), Zurich, and Dr. Salleh Mohd Nor, Malaysia, Tropbio Research Sdn. Bhd.

The Distinguished Service Award (DSA) identifies individuals whose work has noticeably added to advancing IUFRO's scientific, technical, and organizational goals. More than 10 DSAs were presented during business sessions for the following IUFRO officers: Hans Jöbstl (Austria); Robin Cromer (Australia); David George Edwards (Canada); Elias Apud (Chile); Veikko Koski, Risto Päivinen, Jarmo Saarikko (all from Finland); Ulrich Ammer and Walter Eder (both from Germany); Maurizio Merlo (Italy); Fujio Kobayashi (Japan); Abdul Rahim, Nik (Malaysia); David Whitehead (New Zealand); Walter Schönenberger (Switzerland); Martin Price (UK); Stephen B. Horsley, Tom Ledig and Robert Szaro (USA).

It should be mentioned that in the inter-Congress period, the DSA was granted to the following individuals: Garth Nikles (Australia); Ryszard Siwecki and Maciej Giertych (both from Poland); Per Olof Nilsson (Sweden) and Harold Fred Kaiser (USA) in 1996; Amantino de Freitas (Brazil) and Robert A. Plumptre (UK) in 1997; and Simeun Tomanic (Croatia); Màtyàs Csaba (Hungary); Helmut Brandl (Germany); Jiro Kikkawa (Japan) and Harold K. Steen (USA) in 1998 .

At the Opening Ceremony the IUFRO Scientific Achievement Award (SAA) was granted to 11 winners:

- Dr. Per Krister Angelstam, Sweden, University of Agricultural Sciences, Grimso Wildlife Research Station for scientific achievements in the field of ecological structure and processes in natural taiga-landscapes;
- Dr. K. M. Bhat, India, Kerala Forest Research Institute, Division of Wood Sciences for his fundamental and applied research in the fields of forest products, wood sciences and technology;
- Dr. Bruce Dancik, Canada, University of Alberta, Department of Renewable Resources for his outstanding contributions to forest genetic research, sustainable forest management practice and leadership in forest policy development;
- Dr. Jyrki Juhani Kangas, Finland, Finnish Forest Research Institute, Kannus Research Station for research achievements and world-wide recognition in the areas of optimization methods, modelling expertise and participatory and interactive planning of multi-functional forestry;
- Dr. Su See Lee, Malaysia, Forest Research Institute Malaysia, Kepong, Kuala Lumpur for scientific contributions to forest pathology as applied to diseases of fast-growing plantation trees and to dipterocarp ectomycorrhiza research;
- Dr. Collin Price, U.K., University of Wales, Bangor, School of Agriculture and Forest Sciences for contributions to science and distinguished research achievements in the field of theory and application of forest and environmental economics;
- Dr. David D. Reed, USA, Michigan Technological University, School of Forestry and Wood Products for his research on forest biometrics as applied to the quantitative assessment of impacts of stress on forest trees and stands;
- Dr. Alexander Vertessy, Australia, CSIRO Land and Water Canberra; Cooperative Research Centre for Catchment Hydrology (CRCCH) for scientific contributions in the field of deterministic modelling of forest catchment hydrologic processes and in the area of hydrologic field measurement techniques;

- Dr. Michael J. Wingfield, South Africa, University of Pretoria, Forestry and Agricultural Biotechnology Institute for research achievements in the field of plant pathology and the establishment of the Tree Pathology Cooperative Programme;
- Dr. Francis Cho-Hao Yeh, Canada, University of Alberta, Department of Renewable Resources for pioneering achievements in the field of molecular, population and quantitative genetics of forest trees;
- Professor Dr. Stepan Antonovych Gensiruk, Ukraine, Ukrainian State University of Forestry and Wood Technology, Department of Forestry for his research achievements in dynamics of forest changes in mountainous areas and formulation of ecological system for managing nature reserves.

The Outstanding Doctoral Research Award (ODRA) was granted to the following seven scientists:

- Dr. Gangying Hui, China, Chinese Academy of Forestry Beijing, Research Institute of Forestry, for dissertation in 1998, at the University of Gottingen on Integrated Growth and Yield Model System for the Tree Species Cunninghamia lanceolate;
- Dr. Rudolf Kropil, Slovakia, Technical University Zvolen, Department of Forest Protection and Wildlife Management, for dissertation in 1994, at the Technical University Zvolen, on Structure and Production of Breeding Bird Communities in Selected Natural Forests in Slovakia;
- Dr. Reinhold G. Muschler, Costa Rica, Tropical Agricultural Research and Higher Education Centre, for dissertation in 1998 at the University of Florida, on Tree-Crop Compatibility in Agroforestry: Production and Quality of Coffee Grown Under Managed Tree Shade in Costa Rica;
- Dr. Jens Peter Skovsgaard, Denmark, Danish Forest and Landscape Research Institute, Horsholm, for dissertation in 1997, at the Royal Veterinary and Agricultural University, on Management of Sitka Spruce without Thinning;
- Dr. Rahim Sudin, Malaysia, Forest Research Institute Malaysia, Kepong, for dissertation in 1996, at the University of Sheffield, on Development, Properties and Durability of Oil Palm Fibre Cement Composites;
- Dr. Rung Peng Wei, Canada, University of Alberta, for dissertation in 1995, at the Swedish University of Agricultural Sciences, on Prediction of Genetic Diversity and Optimizing Selection in Breeding Programs;
- Dr. Christian Radeloff Volker, USA, University of Wisconsin-Madison, Department of Forest Ecology and Management for the study on Disturbance regimes and landscape scale management in the north-western Wisconsin Pine Barrens, USA.

It became a tradition to launch the Congress commemorative stamps and the first day cover at the Congress Opening Ceremony.

At the plenary sessions, the participants heard five keynote addresses, highlighting the following themes: (i) *Sustainable Management of Natural Resources*; (ii) *Forests and Society Needs*; (iii) *Changes in Environment and Society*; (iv) *People Issues in Forest Management*; and (v) *Global Vision of Forests and Society*.

On August 7, Tan Sri Razali Ismail, Special Adviser to the Prime Minister of Malaysia, delivered the keynote address, entitled: *Sustainable Management of Natural Resources*. He stressed the great magnitude and implications of the earth's destruction through human activities and underlined different aspects of sustainable management of natural resources to resolve these inter-related problems.

At first, he noted the depth and seriousness of the problem of the destruction of the Earth's ecosystems by sometimes senseless human activities. He also stressed the close relationship between

the depletion and extinction of forest ecosystems, flora and fauna species and water and air pollution, and the direct impact of all these factors on the survival of mankind. Noting the role of forests, not only in the maintenance of vital systems, but also their creative character, he said that the destruction, degradation and intensive loss of forests at global level were alarming; natural resources could no longer maintain the existing level of life support. However, he drew attention to the onset of agriculture on forests and the expansion of scaled commercial logging which were very important factors and contributed to deforestation, although being not the main reasons. The reason was, rather, in the logging practices, mismanagement and uncontrolled deforestation.

Mr. Razali identified various aspects of sustainable management. Those were the distribution of land, establishment of a comprehensive system and maintenance of adequate and sustainable state forestland, with inclusive participation of the forest and its associated communities. He touched upon the permanent contradiction between development via industrialization and conservation of natural forests as it needed special attention. People needed to advance education and, knowledge about the importance of forests, and then find ways to save them. The speaker further stressed that everyone in the world had a role in maintaining natural resources, and nature could only make up for a limited number of natural resources on the planet. Mankind should adopt its lifestyle that would provide sustainability of nature at the global, national and individual levels.

In conclusion, he underlined that no country, no matter how rich it might be, could win from decreased stability in the world. He said that unless we learnt how to protect our global common resources, all of us would be threatened. Mr. Razali finished his speech with a bitter remark, borrowed from a famous philosopher: "To pluck a flower is to kill a star"[263], and said that it was strongly suggested changing it as follows: "To plant a tree is to rekindle the universe".

Dr. Christine A. Dean, Forest Geneticist from the Weyerhaeuser Company, Washington, USA, delivered a keynote address, called *Science in Service to Society: Matching Research to Society's Needs*, prepared in co-authorship with Peter Farnum and Mark Plummer. She talked about the role of science in forestry and responsibility of scientists for finding the best ways to develop society to achieve its goals. First, she referred to the acts of vandalism in New York and many other places around the world, speaking about genetic engineering research. "This attack exemplifies a growing problem. Scientific research finds itself embroiled in an increasing variety of social controversies: human genetics, global warming, endangered species and worldwide deforestation. In our papers, we argue that the social responsibility of the scientist is to develop better ways for society to achieve its goals, and to elucidate and quantify the trade-offs society faces so better policy choices can be made in the pursuit of these goals" (IUFRO 2000d, p.152). The author mentioned that social concerns frequently determined the direction and extent of research through funding and governmental mandates and gave two examples, related to genetics and industrial forestry ("getting More from Less"), and modelling and forestry regulations ("getting More and Less").

Discussing the first example, she reminded that, according to the FAO assessment, in 1996, the world had consumed 1.5 billion m^3 of timber for industrial purposes, and this figure was expected to increase to 1.9 billion m^3 in the next decade. Thus, meeting the current demand through harvesting only in natural forests would require up to 1.5 billion hectares of forestland (equivalent to 40% of the forests in the world!). However, growing and harvesting timber from managed forests could reduce the amount by ten times, and switching to high-yield plantations could reduce it even more. In this case, scientific innovations had contributed to technical progress, e.g., getting more from less. Increasing the forest production rates via genetic improvements could help to meet the growing demand for timber from smaller areas of forestland. Therefore, she said that each increase in the

[263] Rephrasing Loren Eiseley's "One could not pluck a flower without troubling a star".

production rates of industrial forests created the potential for more land remaining in its 'natural' state, and timber production, e.g., volume of biomass was one of many other interest of genetics, such as lignin composition, herbicide and insect resistance, climatic adaptability (drought and cold), and wood quality; i.e., specific gravity or fibril angle (ibid., p. 153) etc., to name a few. The other example was analysing three different systems and the precautionary principle that was captured in the following statement: "When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause-and-effect relationships are not fully established scientifically" (Wingspread Consensus Statement on the Precautionary Principle 1999). This principle found numerous applications in international law, including the Rio Declaration on Environment and Development (ibid., p.156). Then the speaker analysed how "a precautionary genetics researcher" and "a cognizant and transparent scientist" would perform in specific situations, having different values and awareness. The authors concluded: "When scientists and their research become embroiled in a controversy, we believe they should avoid the temptation to retreat back into their laboratory; neither should they go to the opposite extreme, abandoning the tenets of science by infusing their research with a particular set of values and interests. The choice of one set of values inevitably comes at the expense of others, and places the scientist beyond the boundaries of her training and discipline; it undermines society's confidence in all science, a discouraging and damaging side effect" (IUFRO 2000d, p.159).

Professor Antonio Andaluz-Westreicher, Universidad Privada de Santa Cruz de la Sierra, Bolivia, called his keynote address *Changes in Environment and Society: How did changes in forests influence society?* He passionately spoke about the opportunities for saving resources and provided examples from personal experience in his native Bolivia. He presented an interesting perspective to look at changes in forests, their impact on society, and influence of deforestation on the society. He said that lack or absence of "experience of forest" was the root of human tragedy: when we spoke to people about the need, as a mandate of intelligence, for conservation and sustainable use of forests, it was as if we were talking about the beauty of colours and the subtlety of tones to blind people, or about the music of Vivaldi or Debussy to deaf people. He noted: "Naturally, politicians could be included among those blind and deaf people; politicians who have never been in a forest, as a source for basic goods and services for the people whose world they rule, but who, nevertheless, make decisions, every day, that affect the future of forests. (…) A practical piece of advice would be: Stop talking to people about protection and environmentally sound use of forests; instead, take them into such forests, where they can get the "experience of the forest" that will make to grow in them eyes to see and ears to hear. Undoubtedly, the main value of forests lies in their spiritual significance for the human soul, since a genuine quality of life has to become being genuinely vital." (IUFRO 2000d, p. 161). He also said that forest had no value in the market and was not a commodity to trade, but a priceless creation, deserving protection.

The speaker emphasized the existential nature of man: a living, intelligent creature on the planet, corresponding to the time, culture and social conditions, abiding in the ecosystem while, however, he was the first unfortunate one that sensed changes in human society because of the conversion of forests into deserts; at the same time, forests' fate was being decided in the cities where the alienation from nature was evident; in the cities, people had forgotten that their lives depended on natural resources, they had no idea about how food was produced, how to get fibre to their clothes, how electricity and water were produced water; they, therefore, had no idea that the resources might be depleted, to say nothing about why they should be saved. Particularly, he focused on forest fires and water conservation.

In conclusion, Professor Andaluz-Westreicher gave a conceptual view on the new forestry law in Bolivia, in particular, the forest plan as a mandatory instrument that determined the

environmental easements under the control of the Forest Service. It was one of the tools of the national forest regime that worked ultimately in building a culture of tree, forest, and human soul. Finally, he stated: “Land planning according to land use is, in this case, the dose prescribed by Paracelsus” (IUFRO 2000d, p.165).

Dr. Robert Lewis, Jr.[264], Deputy Chief for Research and Development, USDA Forest Service, Washington, D.C., USA, focused his keynote address *People Issues in Forest Management* on cultural diversity in forest management. He started with reviewing the world forests and pointed to major global issues such as shrinking resources, population growth, poverty and land use change. He said that forests covered about 4 billion ha of the earth's surface or about 30% of the land area, but because the definition of forest was fairly liberal - land with trees taller than 7 meters and having a density of about 20% or more - the actual forest cover was less; and that one half of the world's forests and 80% of the world's population was in Asia, Latin America, and Africa, and many of the tropical forests were also in developing countries, mostly in the tropical zone (IUFRO 2000d, p.166).

The speaker noted that the shrinking resources were attracting increased public attention to a number of global challenges, including climate change, ozone layer depletion and biodiversity loss. He said that “Too many people, too little land” was a common problem in many places, and would remain in the next few decades because the population growth would increase the pressure on forests; an important factor was poverty because more than half of the world’s population and two-thirds of the population in developing countries still lived in rural areas. More than 80% of the population was relatively poor and relied on the forest for a basic means of livelihood, especially for fuel and land for growing crops. These factors explained the rapid loss of tropical forests (170 million ha between 1980 and 1990). On the top on uncontrolled timber harvesting, land use change for agriculture, industries, and infrastructure had become the leading factors in reduction of forest cover.

Talking about “the people issues”, Dr. Lewis emphasized the importance of the research community to ensure the sustainability of forests in the world; focusing on the US practice, he referred to such programs of the U.S. Forest Service as fire management, forest monitoring/remote sensing, forest health and forest management in watersheds, protected areas and ecotourism, sustainable forestry, etc. He identified a number of challenges for IUFRO, accordingly, the most appropriate research areas such as preservation and restoration of indigenous knowledge, community forestry, expansion of research in the areas of agroforestry and special forest products that provided options to local people, plantations for timber and non-timber forest products, sustainable forestry in the highlands, ecotourism.

In conclusion, Dr. Lewis expressed hope that Dr. Colfer would agree with him, and cited one of her thoughts: “We have to move on from a forestry culture that excludes people. The world’s forests as they exist today are the product of millennia of interactions between people and their environment.” (IUFRO 2000d, p.169).

Professor Mankombu S. Swaminathan, India, Chairman, 10th Plan Steering Committee in the area of Agriculture and allied sectors, Government of India, addressed important issues in his speech entitled *A Global Vision of Forests and Society*[265]. He stressed the meaning of “trees”, and in a collective term “forest” as a whole and its importance for humanity. He talked about the importance of mangrove forests; new frontlines of science, emphasizing the problems of climate,

[264] Dr. Lewis replaced Dr. Carol Colfer of CIFOR who had been invited to make a keynote presentation at this Congress. He mentioned that he had read her speech and found that although both of them used different words and different approaches, they would be speaking about the same subject. Dr. Colfer’s address on Cultural Diversity in Forest Management was also published in the Congress Report ((IUFRO 2000d, p.166, 170-178).

[265] His speech is available only as an extensive abstract (IUFRO 2000d, p.19-20).

forests and culture; he noted the success of biotechnology, genetics and breeding, as well as the recent global initiatives such as the Agenda 21, Framework Convention on Climate Change and the Convention on Biological Diversity.

Talking about sustainable forest management, he defined the concept of "Forest Capital Index" which he had elaborated as a tool to provide a uniform numerical indicator of each nation's current forest capital; its components could include items like surface area, stand biomass, net primary productivity, species richness and diversity, age class of trees, leaf area index, soil fertility including soil organic matter and health of forest stands (IUFRO 2000d, p.20). Finally, he pointed to some critical issues in the years to come, among which he singled out the ecological approach to development, participatory forest management, sharing of non-wood forest products, gender issues and agroforestry as a "harmonizing element of agriculture and forestry" and the green revolution "as a saviour to hunger and feeding of the mass".

The Scientific Program also included 20 Sub-Plenary Sessions, with their themes, corresponding to the main themes of the Congress as reflected in the keynote addresses. Altogether, 99 papers were presented at the Sub-Plenary Sessions (IUFRO 2000a), and each of them was attended by about 300-350 participants.

The Sub-Plenary Sessions on Sustainable Management of Natural Resources discussed the following for topics: Water and Forest; Fire and Forest; Management and Conservation of Forest Gene Resources; Impact of Forest Pests and Air Pollution on Forest Sustainability; Sustainable Forest Management and Productivity; Sustainable Forest Management and Productivity; Criteria and Indicators for Sustainable Forest Management; Perspective at the Level of Forest Management Unit; and Role of Forestry in Landscape Rehabilitation.

The Sub-Plenary Sessions on Forest and Society Needs discussed: Wood Products; Non-Wood Products (NWP); Services; and Evaluation of Technologies for Society Needs.

The Sub-Plenary Sessions on Changes in Environment and Society covered such themes as Environment Change and Forests; Societal Change and Forests; Interaction between Environment and Urban Society; and Forest Consequences: a Tool for Assessing Long-Term Sustainability.

The Sub-Plenary Sessions on Cultural Diversity in Forest Management addressed the following topics: Agroforestry; and Forests in Sustainable Mountain Development.

The Sub-Plenary Sessions on the Global Vision of Forests and Society discussed such issues as Interaction between Forest Science and Forest Policy; Networking and International Cooperation; and Regional Scenarios in Management of Forest Resources in the Tropics.

At Sub-Plenary Session A2: *Fire and Forest*, three posters were displayed by Russian participants (A.P. Sapozhnikov: About necessity of new approach to pyrological estimation of forests; A.V. Volokitina, L.Ph. Nozhenkova, M.A. Sofronov, and D.I. Nazimova: Prognosis of emergency situations under wildland fires; E.S. Arzybashev: Forest fires in Russia). At Sub-Plenary Session A5: S*ustainable Forest Management and Productivity*, A.F. Chmyr and E.L. Maslakov presented their poster, entitled: Under-canopy and preliminary forest cultures as a system of forest growing in conditions of smooth natural regeneration change in the boreal forests of Russia.

In should be noted that each next IUFRO Congress became more complex than the previous one. It was much easier to trace some ideas having a few papers on the topic, but with the diversification of science, it is more difficult to grasp just a few areas of research, e.g., presented at the Plenary Session. This could be reflected in a variety of IUFRO research units as well as their increased number and the increased number of the Divisions. For this reason, we show only the most outstanding or more general issues for each Division.

Division 1 *Silviculture* (Coordinator: Lisa Sennerby Forsse, Sweden) held 13 technical and business meetings where 29 papers were discussed. The most popular themes were Tropical forest restoration-I Poster/panel discussion (136 people attended); "International markets for carbon

sequestration from tropical forests" (90 people) and the second session of "Tropical forest restoration" (75 people attended).

Division 2 *Physiology and Genetics* (Coordinator: Dr. Eric Teissier du Cros, France) held 16 technical and business meetings which discussed 41 papers. The most popular themes were Future of breeding and plantations in sustainability-oriented world (session IId – 150 participants); Genetic improvement (75) and Vegetative propagation (52).

Division 3 *Forest Operations and Techniques* (Coordinator: Dr. Dennis P. Dykstra, USA) held 22 technical and business meetings which discussed 44 papers. The most popular themes were Forest operations in the tropics (75); and Harvesting, wood delivery and utilisation (68).

Division 4 *Inventory, Growth, Yield, Quantitative and Management Sciences* (Coordinator: Dr. Klaus v. Gadow, Germany) held 22 technical and business meetings which discussed 89 papers – the highest amount among all the Divisions. The most popular themes were Effects of environmental changes on forest growth (95); Sustainable forest management under conditions of growing global pressures (77); the second session on Using models for forest growth and stand dynamics to evaluate sustainability (75); and Forest resources assessment 2000 (65 participants).

Division 5 *Forest Products* (Coordinator: Mr. John A. Youngquist, USA) held 31 technical and business meetings which discussed 82 papers. The most popular themes were Production and utilization of bamboo and related species. Challenges for the new millennium (75); Non-wood forest products (60); Wood quality (60) and Composite and reconstituted products (53).

Division 6 *Social, Economic, Information and Policy Sciences* (Coordinator: Dr. Niels Elers Koch, Denmark) held 29 technical and business meetings and discussed 87 papers. The most popular themes were Sustainable land use as precondition for sustainable forestry (68); Bridging the gap between monetary and non-monetary valuation of environmental amenities (61); and Modelling forest managers environmental decisions (55 participants).

Division 7 *Forest Health* (Coordinator: Dr. David F. Karnosky, USA) was established in 1996 with four Research Groups: 7.01.00 (Physiology and Genetics of Tree/Phytophage Interactions), 7.02.00 (Pathology), 7.03.00 (Entomology), and 7.04.00 (Impacts of Air Pollution on Forest Ecosystems). It held 11 technical and business meetings and discussed 45 papers. The most popular themes at this Congress were the second session on Biological invasions as agents of global change (62) and Insect pest problems in replanted forests (98 participants in two sessions II and I).

Division 8 *Forest Environment* (Coordinator: Dr. Kyoji Sassa, Japan) was established in 1995 and made operational in 1996. The Division held 21 technical and business meetings and discussed 63 papers. The most popular themes were Biodiversity (92); the third session on Forest Fire. Temperate and boreal forests. General discussions (poster/panel sessions with 50 participants).

Eight Task Forces held 12 technical and business sessions and discussed 35 papers. The SPDC held two meetings where 6 papers were discussed.

At the meetings of over 120 research units, more than 600 papers were presented (IUFRO 2000b). On August 8-9, 2000, about 1,000 posters (IUFRO 2000c) were demonstrated in the exhibition hall. To emphasize the significance of scientific posters as an important tool of scientific exchange in addition to verbal presentations, the sixth award for the best posters (IUFRO Best Poster Award) was introduced at this Congress, and the authors of 9 posters received it at the Closing Ceremony on August 11, 2000. One poster was chosen from each IUFRO Division and one poster was selected from the Task Forces. In the Divisions, the Award Winners were: D1 – Staffan Jacobson, et al. (Sweden); D2 – Antoine Kalinganire (Australia); D3 – Ivor K Edwards (Canada); D4 – Daniel Mailly, et al. (Canada); D5 – Tord Magnussen, et al. (Sweden); D6 – Karl Hogl (Austria); D7 – Laurence G. Kirton, et al. (Malaysia); D8 – Chris Phillips (Australia); and from the Task Forces – Margarida Tomé, et al. (Portugal).

Organizational matters

Traditionally, the International Council held two meetings at the Congress – on August 8 and August 11, 2000. The IUFRO President reported about the Union's activities, underlining all major achievements and highlighting the period between the two Congresses.

President Jeffery Burley reported that in the inter-Congress period, IUFRO had held 334 meetings in 65 countries of which 41 were developing and emerging economies. He said: "These resulted in, inter alia, 91 sets of proceedings. In addition, 9 Occasional Papers, 6 IUFRO World Series books and 4 IUFRO Research Series books were published. The IUFRO News appeared quarterly in English and four-monthly in Spanish while, of course, an annual report was published each year" (IUFRO 2000d, p.189). He also presented a proposal on a new, more functional structure of IUFRO to be discussed and adopted.

Dr. Risto Seppälä, Vice President (Programme) reported about activities of the Programme Committee (as its Chair) and SPDC (as its Supervisor) as well as about Divisions' and TFs' activities as the Coordinators and Deputy Coordinators were Members of the Programme Committee.

Dr. Jacob L. Whitmore, Vice President (Administration) reported about activities of the Administrative Committee which included the Treasurer and, at least, four Members of the Executive Board, and about other activities and Committees, related to his position – the Nominating, Statutes and Internal Regulations, Ad Hoc, Resolution and other Committees. Dr. Whitmore was elected to this position at the beginning of 1997 after Vice President Dr. Jerry Sesco received a new position at the USDA Forest Service and left IUFRO.

In addition, all the Divisions reported about their activities within the last five years, including various conferences, IUFRO Divisional and Inter-Divisional Meetings, establishment of new research units and appointments or changes in their leadership, awards, publications, etc.

As stated in the Congress Report (IUFRO 2000d, p.185-186), the President's Report covered all major achievements and highlights of the last inter-Congress period. Its brief summary read as follows: "The Executive Board took account of the Resolutions of the XX IUFRO World Congress in Tampere, Finland.

- It drew up a Strategic Plan for the Union.
- It issued Bidding Rules for IUFRO Congresses.
- It established the Terminology Project based at the IUFRO Secretariat.
- It developed and expanded an incomparable web site.
- It increased the number of IUFRO publications, including creating a new series published jointly with CAB International (CABI), the IUFRO Research Series.
- It established the Global Forest Information Service, an Internet-based meta-data service to coordinate worldwide access to forest information.
- It strengthened and enhanced the work of the Special Programme for Developing Countries and the IUFRO Secretariat.
- The Executive Board commissioned an external Review of the IUFRO Secretariat, SPDC and Terminology Project.
- A common format for Agenda papers submitted to the IC was developed.
- Three Honorary Memberships were proposed to and later agreed by the IC by ballot vote. Honorary Membership was conferred on: Howard Kriebel, USA (handed over at the Division 2 Meeting in Beijing, China, 1998); M.N. Salleh, Malaysia (awarded in 1999, but handed over at the IUFRO Congress); Franz Schmithüsen, Switzerland (2000, and handed over at the IUFRO Congress).
- It prepared amended IUFRO Statutes for decision by the International Council.

The IC Meeting approved the Resolutions of the 21st IUFRO World Congress, addressed to all Member Organizations and governmental authorities responsible for forest affairs in IUFRO countries. The Resolutions addressed six topics: Role of Forests and Trees in Human Welfare; Attention by Policy-Makers; Role in Intergovernmental Processes; Research and the Input of Forestry Activities; Information; and Research Capacity. The Resolutions were translated into the four official IUFRO languages and distributed to Congress participants at the Closing Ceremony.

The IC Meeting decided on the venue of the 22nd IUFRO Congress. According to the newly adopted Bidding Rules the offer to the IUFRO members of Australia to hold the Congress in Brisbane in August 2005 was accepted".

The IUFRO International Council approved the new IUFRO Statutes and Internal Regulations as based on the following revisions, adopted at the 21st IUFRO World Congress in Malaysia: "In preparing the revision of the 1990 Statutes and Internal Regulations, the Union's Executive Board bore the following principles in mind: to seek simplicity, transparency and flexibility; to minimize changes to the existing version; to maintain the numbering of that version as closely as possible; to recognize the changing perception of forestry and forest-related science; and to incorporate some suggestions of a recent external review of IUFRO's Secretariat and Special Programme for Developing Countries. Important points are:

1. Change in IUFRO's title (English version) from Forestry to Forest[266] to reflect the widespread activity in forest related science, and to encourage membership from outside the traditional forestry sector. It reads now "International Union of Forest Research Organizations".
2. Introduction of the post of "Executive Secretary".
3. Clarification of the roles of President and Executive Secretary, to maximize transparency and minimize overlap while enhancing management of the Union's business.
4. Reorganization of Divisions 1 and 2 and the creation of Divisions 7 and 8 to reflect the increase in activities in their topics and the complexity of the workload of their Division Coordinators (approved by the International Council in 1995).
5. Replacement of the titles Subject Group and Project Group with Research Group to reflect the earlier decision of the International Council and to encourage cross-disciplinary research throughout the Union.
6. Replacement of officer titles of Research Group Leader and Working Party Chair with Coordinator to provide consistency with Division Coordinator.
7. Creation of categories of awards to enhance the recognition of high-quality scientific research.
8. Establishment of a Finance Committee to advise the President on a variety of fiscal management options.
9. Change from Swiss Francs to Euros while maintaining US Dollars as acceptable currency for payment of IUFRO membership fees.
10. Provision of bidding rules for aspiring hosts of IUFRO World Congresses to facilitate early preparation and equitable, transparent evaluation of their applications.
11. Change of focus for the International Council to provide advice to the President and Board and to facilitate its work in guiding IUFRO policy.
12. Meetings of the International Council outside the Congress may be called by the President. He may call such meetings for decision-making purposes, physically or electronically or by mail.

[266] No changes in the Russian title of the Union.

13. Introduction of voting by proxy in International Council business to maintain international equity, recognizing that some members are unable to attend all meetings and to obtain a quorum of voters for major issues.
14. Removal of gender-specific text.
15. Creation of new categories of awards to enhance the recognition of high-quality scientific research.
16. Cessation of Board membership for members from Regions and increase in the number of General Members of the Board in order to achieve a more equitable representation of geography, gender, nationality and scientific discipline.
17. New names for the Vice Presidents:

- Vice President Science for the former Vice President Programme and
- Vice President Policy for the former Vice President Administration.

18. Addition of the category of Sustaining Member for organizations or individuals provi-ding substantial financial support to the Union toward its aims as defined in Article II" (IUFRO 2000b, p.185-186; IUFRO Statutes and Internal Regulations 2011, p.2).

Here, it should be mentioned that "the International Council (IC) is the supreme authority regulating the affairs of the Union and guiding its Executive Board. According to the IUFRO Statutes, each country, in which IUFRO has a Member Organization, has one delegate and an alternate member in the IC, irrespective of the number of the member institutions" (ibid., p.185).

Also: "The Executive Board has encouraged the regionalization of IUFRO management and scientific cooperation through the recognition of Chapters such as the Asia Pacific Association of Forest Research Institutes (APAFRI)[267] for which the Secretariat is currently located here in Malaysia" (IUFRO 2000d, p.51).

Following the newly adopted rules, the International Council supported the proposal of member organizations from Australia to hold the next Congress in August 2005 in Brisbane.

The Congress adopted the following decisions on the election of its officeholders: Risto Seppälä from Finland was elected IUFRO President (2001-2005); Eric Teissier du Cros from France was elected Vice-President Programme, and Don Koo Lee from the Republic of Korea was elected Vice-President Policy. Division Coordinators were elected: D1 – John Parrotta (USA); D2 – Ladislav Paule (Slovakia); D3 – Dennis Dykstra (USA); D4 – Klaus von Gadov (Germany); D5 – Cathy Wang (Taiwan); D6 – Niels Elers Koch (Denmark); D7 – Kazuo Suzuki (Japan); and D8 – Alain Franc (France).

The following individuals became the Executive Board (EB) Members from the nine Regions: Susan Conard (USA); Ruben Guevara (Honduras/Peru); Vitor Afonso Hoeflich (Brazil); John Innes (UK/Canada); Iba Kone (Kenya); Gordon Miller (Canada); Abdul Razak (Malaysia); Victor K. Teplyakov (Russia); Karel Vančura (Czech Republic); Yaoguo Xiong (China).

The other EB Members were also elected: Immediate Past-President Jeffery Burley (UK); Executive Secretary Heinrich Schmutzenhofer (Austria); Treasurer Mario Broggi (Switzerland); Chair of the Congress Organizing Committee for the next Congress Russel Haines (Australia), and Observer from the FAO Hosny El-Lakany.

The Enlarged Executive Board (EEB) also included:

- Division Deputy Coordinators: D1 – Jerry Vanclay (Australia), Björn Hånell (Sweden),

[267] Similar Chapter "IUFRO in Russia" was established by the Russian members of the Union. The idea to combine and coordinate efforts was implemented on September 28, 2001 as a result of the representative meeting which decided to establish the Association of Russian IUFRO member-organizations.

Florencia Montagnini (Argentina/Costa Rica); D2 – Màtyàs Csaba (Hungary), Robert Luxmoore (USA), Zohra Bennadji (Uruguay); D3 – Hans Heinimann (Switzerland); Amaury De Souza (Brazi); Mike Menzies (New Zealand); D4 – Lauri Valsta (Finland); Steen Magnussen (Canada), Margarida Tomé (Portugal); D5 – Howard Rosen (USA), Mahabala Bhat (India), Paul Fung (Australia); D6 – Perry Brown (USA), Susanna Benedetti (Chile), Lucrecio Rebugio (Philippines); D7 – Kevin Percy (Canada), Jean-Claude Gregoire (Belgium), David Karnosky (USA); D8 – Rahim Nik (Malaysia), Albert Goettle (Germany), James Boyle (USA);

- Coordinator of the Terminology Project *SilvaVoc* – Renate Prueller (Austria);
- Coordinator of the Global Forest Information Service (vacant);
- Coordinators of the Task Forces: Environmental Change – John Innes (UK/Canada); Forests in Sustainable Mountain Development – Martin Grosjean (Switzerland); Management and Conservation of Forest Gene Resources – Per Ståhl (Sweden); Water and Forests – Rob Vertessy (Australia); Science/Policy Interface – Richard Guldin (USA); Public Relations in Forest Science – Max Krott (Germany).

On Friday, August 11, 2000, at 14.30-16.00, the President's Panel Discussion was organized by President J. Burley to discuss major issues dealing with International Research Policy - Forestry and Wood Industries: Comments on Congress Resolutions. President J. Burley invited distinguished figures, representing donor agencies and international organizations – long-term collaborators and supporters of IUFRO. The panellists included: Dr Yves Birot (France), Dr Robert Lewis (USA), Professor Jeff Sayer (CIFOR), Dr Yvan Hardy (Canada), Dr Peter Poschen (ILO), Dr Jacques Valeix (France) and Mr Duncan Macqueen (UK), who also served as a rapporteur of this meeting, chaired by Professor J. Burley.

The Panel covered a wide range of issues, discussed all the six paragraphs of the Congress Resolutions, answered a number of questions, and "helped to clarify IUFRO's vision". It was a vision that defined why IUFRO wished to promote collaboration in research and how it intended to do this (IUFRO 2000d, p.144).

On August 12, at the Closing Ceremony was attended by almost 2,000 participants and Congress volunteers – Professor Jeffery Burley sincerely thanked all participants, members of the Organizing Committee and all involved in the Congress work for the work well done. Dr. Abdul Rahim Nik as Chairman of the Congress Organizing Committee thanked the IUFRO Board for entrusting and supporting his job along with the hundreds of volunteers and Congress assistants.

Then, Dr. John Youngquist read the citations and Dr. Eric Teissier du Cros presented the Best Poster Award to the winners. One more bestowal was an announcement of the winner of the IUFRO logo competition: Mr. Jean Menetrier of Forestry Canada. Two more awardees were Dr. Abdul Rahim Nik (Malaysia) and Dr. Fujio Kobayashi (Japan), who received the Distinguished Service Award.

After the introduction of the newly elected Board, President-Elect Dr. Risto Seppälä (Finland) presented his vision for IUFRO's development for the next five years. He also announced that the venue of the next Congress would be Brisbane, Australia. IUFRO would be coming to another continent. A spectacular performance on the Didgeridoo was given by an Australian aboriginal musician who welcomed all delegates to Australia in 2005[268].

Professor Russell Haines, Queensland Forestry Research Institute (Australia), Chairman of the Congress Organizing Committee for the 22nd IUFRO World Congress, delivered a short speech and received the IUFRO flag to be brought to Australia. After that, Professor Burley officially closed the Congress.

[268] Didgeridoo (or didgeridu) is a wind instrument, developed by indigenous people of northern Australia.

The tree planting ceremony took place on August 12, 2000, in the presence of representatives from over 90 countries (International Council, EB Members, FRIM Directorate). Invited honourable guests were Professor Jeffery Burley, IUFRO President, Tan Sri Rama Iyer, Chairman of the Malaysian Forestry Research and Development Board, and Mr. Ishak Mohd Yusof, Senior Vice President, Bumiputra-Commerce Bank Berhad. Five types of Malaysian native tree species were planted: *Dyera costulata*, *Dryobalanops aromatic*, *Mesua ferrea*, *Aqualaria malaccensis* and *Neolitsea zeylanica*.

Resolutions

The IUFRO World Congress resolutions were written in the four official languages – English, French, German and Spanish (IUFRO 2000, p.129-141).

RESOLUTIONS
of the XXI Congress
International Union of Forestry Research Organizations
12 August 2000

Resolution 1. Role of forests and trees in human welfare

Considerations *Recognizing* the great contributions made by forests, trees, industries and the forestry profession to human, environmental, economic and socio-cultural welfare,

further recognizing the contributions to poverty alleviation, the stimulating of development and reversing environmental decline,

further recognizing the importance of cultural diversity, and

further recognizing that research is undertaken at different intensities depending on the geographical extent of a problem, the level at which it is approached, and the inter-relationships with other problems,

Resolutions IUFRO should continue and expand its stimulation and support for research, and provide the knowledge necessary to achieve sustainable forest management within differing physical and social landscapes; it should seek to reconcile conflicting demands for wood and non-wood products, environmental services and social benefits; IUFRO should also seek appropriate knowledge, particularly from indigenous people.

Resolution 2. Attention by policymaker

Considerations *Noting* the increasing attention paid to forests by international and national agencies, international NGOs, commercial enterprises and academic institutions, and the need for reliable information by decision-makers in such organizations,

Resolutions research should be increasingly directed towards forest policy-related issues in the major environmental and social conditions including urban, mountain and dry environments; IUFRO has a major role in enhancing the interface of science, policy and industry, aiming at better provision of all forest benefits, goods and services.

Resolution 3. Role in intergovernmental processes

Considerations *Being* aware of the place of forestry in the considerations of several inter-governmental processes, and of IUFRO's unique capacity to mobilize a broad range of individual and collective expertise,

Resolutions IUFRO should strengthen its contributions to international debates and political processes, specifically those relating to: genetic resources and biotechnology; biodiversity; sustainable forest management; climate change and carbon sequestration; soil; water; fire; deforestation, forest degradation and desertification. It should promote the transfer of socially acceptable, environmentally sound techniques.

Resolution 4. Research and the impacts of forestry activities

Considerations *Considering* the public concern for the possible impacts of forestry activities on global and local environments, social welfare and biodiversity, and

remembering that IUFRO's research traditionally focuses and progresses in major disciplines,

Resolutions research should increase within single disciplines while simultaneously moving towards an interdisciplinary, problem-solving approach; IUFRO should seek closer collaboration with other research organizations, while bringing its experience and networking powers to assist other research networks and consortia.

Resolution 5. Information

Considerations *Appreciating* the research undertaken and the forest and forest products technologies developed, especially by IUFRO member institutions and individual scientists,

realizing that much of this information is available in scattered sources and forms, and

observing the rapid development and availability of information technologies,

Resolutions existing information should be made available in accessible and appropriate forms for the wide range of users; forest research institutions should strive to divulge their research results; use of the IUFRO Net, and development of the Global Forest Information Service led by IUFRO, should be intensified and IUFRO research units should continue to disseminate statements of the current state of knowledge in their specific fields.

Resolution 6. Research capacity

Considerations *Believing* that forest research capacity is low in countries with developing and emerging economies, and that women scientists are under-represented and insufficiently supported in forest research,

Resolutions IUFRO should expand its collaboration with other organizations that seek to enhance biophysical and social research capacity in countries with developing and emerging economies; it should encourage the role of women and disadvantaged researchers in forest sciences.

Excursions

On August 10, 2000, the following 9 one-day tours were offered for participants:

1. Rubber-wood industry in historical Malacca
2. Landscape, recreation and urban forestry
3. The tropical lowland rainforest - research and recreation in the state of Negeri Sembilan.
4. Sustainable forest management and wildlife conservation
5. Plantation of Dryobalanops aromatica
6. Integrating forest landscape management in land development.
7. Visit to the premier research institutions – FRIM and MRB [269]
8. Mangrove forest and the community
9. Cultural heritage of the aborigines and lowland tropical forest.

Almost 1,100 delegates and accompanying persons participated in these one-day excursions.

The authors of this book participated in Excursion 7: Visit to the premier research institutions - FRIM and MRB. The Forest Research Institute of Malaysia (FRIM) in Kepong was located 16 km north-west of Kuala Lumpur. Founded in 1929 as the Forest Research Institute, it received the current status only in 1986 by a special Decree of the Government of Malaysia. The institute was located in a picturesque location on an area of about 550 ha. It was a public entity in the jurisdiction

[269] FRIM means the Forest Research Institute Malaysia; MRB stands for the Malaysia Rubber Board, the custodian of the national rubber industry.

of the Ministry of Natural Resources and Environment. The institute not only conducted research, but also facilitated learning processes to obtain research experience in typical tropical forests of Malaysia. In the immediate vicinity of the institute one could walk through the jungle to see water-falls, but the Institute had an arboretum (more than 54,000 plants), very large herbarium, modern library and museum. The Institute was addressing a wide range of problems, not only in Kepong, but also in its nine forest experiment stations, located in the typical forest zones of the peninsula.

After the Congress, participants could choose from 15 multi-day excursions (4-5 days each) to nine destinations in the country (Peninsular Malaysia, Sabah and Sarawak) and six destinations in four neighbouring ASEAN countries: Brunei, Indonesia, Singapore and Thailand. For some reasons, routes 11, 12 and 14 were cancelled. Altogether, over 300 delegates and accompanying persons participated in the tours. A number of excursion routes introduced multipurpose forestry in the northern regions of Malaysia:

Route 1. Best Managed Mangrove in Malaysia. Participants: 6. They visited the famous Matang Mangrove Forest (state of Perak) – the largest single mangrove forest in Malaysia – 40,151 ha. The group could find out how mangrove forests were managed, and they saw replanting, thinning and harvesting operations in mangrove forests and production of charcoal. Then, the group visited the Forestry Museum in Penang, Pulau Pinang Forestry Museum, famous Butterfly Farm, (Caged fish farming) in Kuala Sepetang, Perak Royal Museum, etc.

Route 2. Growing Trees for the Future. Participants: 15. The group was familiarized with the Multi-Storeyed Forest Management System at Chikus Forest Reserve, Bidor, Perak on an area of 2,000 ha of tropical lowland forests, about 40% of which were planted with *Acacia mangium*. Then, in Merbok, Kedah, the participants visited the largest medium density fibreboard (MDF) factory in the northern part of Malaysia. This plant used timber from plantations. The group also visited the FRIM's Teak Research Centre at Mata Ayer, Perlis, the Langkawi Crocodile Farm and the Craft Cultural Complex where they saw traditional crafts from all over Malaysia.

Route 3. Sustainable Forest Management of Natural Forest. Participants: 67. The main objective was to demonstrate sustainable forest management in natural forests under forest concessions at Pasir Raja, Terengganu. Participants saw logging operations and research work at ITTO-FRIM-KPKKT[270] and two Japanese institutions[271]. They also visited a recreation park, forest inspection station, downstream wood carving facility, batik handicraft facilities, cultural market, Tasik Kenyir Resort and some other places.

Route 4. National Park Management and Forestry Activities. Participants: 40. The group could see the richness of the tropical rainforest fauna and flora in their natural habitats. The main objective of the excursion was to show the management of National Parks and protection of wildlife. In addition to the National Park itself, the participants visited the Orang Asli or an aboriginal settlement, woodcraft facility, and were informed about the importance of commercial forest plantations for sustainable timber supply at the Kemasul Forest Plantation, Pahang.

Route 5. Wood Processing Industry. Participants: 20. The group could see the Taman Mini Malaysia and Mini ASEAN, Melaka, with traditional Malaysian and ASEAN wooden architecture. The participants also visited rubber-wood processing industries in Johor and saw rubber-wood processing operations to manufacture bent wood, the Nasuha Enterprise Sdn Bhd, specialized in Malaysian and exotic spices and herbal plants and products, tropical rain forest at the Gunung

[270] Kumpulan Pengurusan Kayu-Kayan Terengganu Sdn. Bhd. – a timber management and export group of the Terengganu State, oriented to sustainable forest management and positioning itself as a fully integrated timber enterprise.

[271] The Japanese International Research Centre for Agricultural Sciences and Oikawa Motor Company Ltd.

Ledang (Mount Ophir) Resort, and, finally, the Singapore Botanical Garden with its tropical orchid collection, one of the biggest collections in the world.

Route 6. Model of Certified Forest and Orang Utan Rehabilitation (Sabah). Participants: 35. The group visited the very interesting Sepilok Orang Utan Rehabilitation Centre (SOURC), Sandakan, and received information about the orang utan scientific rehabilitation techniques. Then, at the Deramakot Forest Reserve (DFR), covering an area of 55,000 ha, the participants were informed about various aspects and techniques of sustainable management of tropical rainforests and directional felling methods to minimize logging damage. The SGS-Forestry Malaysia [272] certified this Reserve, under the QUALIFOR Forestry Programme in 1977, and in 1989, a GTZ-supported SFM project was launched.

Route 7. Biodiversity in Sustainably Managed Forest (Sabah). Participants: 37. The group visited a private protected area (PPA), covering 438 km^2. In the Danum Valley Field Centre (DVFC), Lahad Datu, the participants were told that this PPA represented both natural treasure and served as a bridge for land managers and conservationists to work together on sustainable land management. Then they visited the Innoprise-FACE Foundation Rainforest Rehabilitation Project (INFAPRO), involved in planting of indigenous tree species in cut-over forest areas and participated in the tree planting ceremony. The participants also visited the site with fast growing species near the Tilawas Forestry and Recreational Centre (TFRC) and, finally, enjoyed the sights from Mount Kinabalu – the highest point in South-East Asia – as well as the richness of endemic species of flora and fauna in the vicinity of the park.

Route 8. Peat Swamp Forest Management (Sarawak). Participants: 26. The group visited a logging site in a peat swamp forest at Loba Kabang, Sibu. The participants took a locomotive ride and observed the "kuda-kuda" system of pulling logs from the stump to log-landing site. Then, they visited the particleboard mill in Sibu, the Semenggoh Wildlife Rehabilitation Centre, the Semenggoh Botanical Research Centre, and the Bako National Park where they saw a proboscis monkey at the Visitors' Day Centre and various species of Nephanthes along the trail. In the evening and at night, the participants were taken for a walk over the typical Night Market in Sibu. Under the cultural part of the trip, the participants visited the Sarawak Cultural Village and the Sarawak Pottery Centre in Kuching.

Route 9. Role of Local People (Sarawak). Participants: 39. The group visited the Lambir Hill National Park, the Latak Waterfall, Canopy Biology Plot, where they climbed a 40-meter-tall tree tower to see the typical canopy structure of the forest. They also visited the Niah Museum at the Niah National Park, to get acquainted with the historical, archaeological and cultural heritage of the Niah Caves. In the area of the Great Caves, they visited local communities and saw local people collecting guano and harvesting edible birds' nests, then, they visited the local Penan settlements along the Melinau River and talked to local people near the Mulu National Park.

At the registration, the Congress participants were offered six excursions to neighbouring countries:

Route 10. Forest Genetic Resources in Thailand. Participants: 8. The group saw nursery operations and vegetative propagation of forest trees, herbs and medicinal plant collections at the Songkla Nursery Centre, and was acquainted with silvicultural research at the Silvicultural Research Centre, Royal Forestry Department of Thailand. They were also familiarized with bird conservation and species diversity in a wetland area under the Wetland RAMSAR Programme at the Wildlife Nursing and Raising Centre, Pattalung. "At the Ranong Biosphere and Mangrove Forest Research Centre, they were briefed on mangrove research programmes with *Rhizophora apiculata* and

[272] Forest certification under the Forest Stewardship Council (FSC) Forest Management Certification scheme.

Rhizophora mucronata as the main research subjects, and learned about conservation efforts for shrimps, crabs, fishes and other marine fauna. In addition, they also witnessed a traditional southern custom at the Southern Study Centre and experienced a short stay in a fishing village at Pan Yee Island" (IUFRO 2000d, p.27-28).

Route 11. Agroforestry and Community Forest, Thailand (cancelled);

Route 12. Teak Plantation in Central Java, Indonesia (cancelled);

Route 13. Botanical Garden and National Park in West Java, Indonesia. Participants: 15. The group went to the Bogor Botanical Garden – a living museum of 87 ha with the most complete collection of tropical plants in the world. The Garden's collection included about 3,600 plant species, belonging to over 1,290 genera and 200 families. The next point was CIFOR, an independent research institution established in 1993, and then the Gade Pangrango National Park, which included the Cibodas Nature Reserve, the oldest forest reserve in Indonesia, and the Mount Halimun National Park, which was a 40,000 ha watershed, protecting the hydrological system, conservation of ecosystem diversity, and opportunity for eco-tourism, research and education.

Route 14. Pulp-Paper Industry in North Sumatra, Indonesia (cancelled).

Route 15. National Park Management in Brunei Darussalam. Participants: 9. First, the group took a boat ride to the Selirong Island Mangrove Park and the Kampung Air (Estuarine Village), which offered fascinating wilderness scenery. Then, the participants moved by boat to Bangar Town in a meandering water channel that was lined with one of the largest mangrove forests in the region, and from there – to the Ulu Tembulong National Park with its vegetation succession and transformation, birds and other wildlife; there, they also climbed a 65-meter high canopy walkway to see the crown of the trees from above. At the Kuala Belalong Field Study Centre, they walked through the jungles. At the end of the journey, they visited a waterfall area along the Apan River and enjoyed bumping over the rapids with inflatable rafts.

The Congress organizers prepared a special sightseeing programme for accompanying Persons, which included such package tours as City tour, nature tour, twinkle-twinkle fireflies, Malacca historical and cultural tour, and others.

Russian participation

The Russian participants of the Congress included 6 representatives of the academic science, 3 from universities, and 1 from non-governmental organizations (IUFRO 2000f): Vladimir N. Bolshakov, Institute of Ecology of Plants and Animals, RAS, Ekaterinburg; Anatoly A. Golub, Plant Quarantine Inspection of Novosibirsk Region; Alexander V. Kirdyanov, Lyudmila I.Romanova and Nina E. Sudachkova, Sukachev Institute of Forest, Siberian Branch, RAS, Krasnoyarsk; Oleg A. Kulinich, Russian Centre of Plant Quarantine, Bykovo; Irina S. Rykunina, Valentin S. Shalaev, Moscow State Forest University; Victor K.Teplyakov, IUCN (World Conservation Union), ERO Programme Office for CIS, and Moscow State Forest University; Igor A. Yakovlev, Mariy State Technical University, Yoshkar-Ola

In addition, the registered participants from Russia included 34 representatives from publicly-owned and private forest enterprises and joint ventures as well as from regional administrative bodies, mainly from Siberia and the Russian Far East (IUFRO 2000g).

Andrei U. Abramov, Andrei A.Benin, Dmitri M. Dedov, Michail D. Dolgin, Nikolai P. Raskatov, Lyudmila B. Solodovnichenko, LEMO Concern, St. Petersburg; Lyudmila G. Afanasyeva, Ministry of Foreign Economic Relations of the Sakha Republic; Linna Baldanova, Baldanova Ltd. Moscow; Pavel F. Bezmaternykh, Valeriy V. Dutov, Kezhma Region Administration; Julustan A. Borisov and Elena G. Borisova, CFIC JSC, Moscow; Irina T. Bubeeva, Bubeeva Ltd.; Victor M. Budyschev, Mass JSC, Sakha Republic; Victor N. Budyschev, Sakhales

JSC, Sakha Republic; Yulia G. Ilyina, Russia-ASEAN Cooperation Fund; Igor V. Kozlov, Government of Sakha Republic; Anastasia I. Kozlova, Sahales JSC, Sakha Republic; Vyacheslav S. Olesov, Forestry Department of Sakha Republic; Andrey V. Osovsky, Uyut JSC; Tatiana U. Permjakova, Morportservice-Eurotransservice Holding; Hans Persson, Lemo Agency AB (Sweden); Vyacheslav M. Petukhov, Chita Regional Administration; Oleg A. Popov, EPOS JSC, Chita; Aydar B. Samigullin, Zelenodolsk Plywood Plant, Republic Tatarstan; Irina V. Speranskaya, Russia-ASEAN Cooperation Fund, Moscow; Gennady B. Stukalov, Angarsk LK JSC; Valery S. Sukhanov, Igor V. Voskoboynikov, State R&D Forestry Centre, Moscow; Evgeniy A. Shevlyakov, Vasiliy Taranyuk, Vladimir Zoulev, Lesosibirsk LDK 1 JSC, Krasnoyarsk; Andrew Zviedris and Igor Zviedris, TIS JSC, Khabarovsk.

The Russian participants submitted 45 papers, including 28 posters:

1. Borissoff, V.A. Environmental changes recording with special reference to Russian protected areas;
2. Chumachenko, S.I., Palyonova, M.M., Starostenko, D.A., Korotkov, V.N. Forecast of forest ecosystem dynamics under different scenarios of forest management (Mathematical modelling on GIS-technology basis);
3. Golubeva, E., Spektor, V. The impact of industrial pollution on the vegetation of Northern Siberia;
4. Gorozhankina, S.M., Konstantinov, V.D. Geographic specificity of forest cover within side-enisey middle taiga area;
5. Konstantinov, V.K., Velikanov, G.B. Drainage and secondary inundation in the Leningrad Region;
6. Korotkov, A. The UN-ECE/FAO forest resource assessment 2000. An overview;
7. Kostrikin, V.A. Establishment of genetic resource data bases for forest flora;
8. Kostrikin, V.A., Kobzeva, S.G. Data base on genetic resources of woody species in the south forest-steppe of Russia;
9. Kulinich, O.A. Possible adaptation and pathogenicity of pine wood nematode, Bursaphelenchus xylophilus in central European Russia;
10. Kurbanov, E., Tikina, A. Ways to sustainable forest management in the Mari El republic of Russia;
11. Malkov, J.V., Shalaev, V.S. Optimization of parametrics of ecological monitoring;
12. Rykunina, I. New opportunities in forestry for the woodworking industry in the Russian Federation;
13. Shulga, G. Application of industrial wood waste for the development of multi purposes glue;
14. Strakhov, V.V., Filipchuk, A.N. Ecosystem management of forests in Russia. Strategy of forest account works;
15. Sukhorukova, L.I., Belenets, Y.E., Kobrin, N.Y. The forest fire transformation of soil cover condition;
16. Vaganov, E.A. Dendroclimatic network through Russia;
17. Zyryanova, O.A., Bugaenko, T.N., Bugaenko, N.N. Plant species diversity of larch ecosystems of Siberian cryolithic zone and its post-fire transformation.

Posters:

18. Alekseev, A.S. Sinergetic Theory of the Forest Stands Growth, Structure and Stability;
19. Antonova, G.F. The Reasons for Earlywood and Latewood Formation;
20. Arzybashev, E.S. Forest fires in Russia;
21. Belova, N.V. The Factors Effecting Infestation of Picea obovata Cones by Adelges (*Adelgidae*, *Homoptera*);
22. Bolshakov, V.N. Current state of forest ecosystems in the Urals;

23. Chmyr, A.F., Maslakov, E.L. Under-canopy and preliminary forest cultures as a system of forest growing in conditions of smooth natural regeneration change in the boreal forests of Russia;
24. Dekatov, N.N., Pirogov N.A. Aspen Forest Stands of the North-west of Russia are a Potential Base for Forest Stock Improvement;
25. Isaev, A.S. Entomological Monitoring in Boreal Forests;
26. Kirdyanov, V. Dendroclimatic Analysis of Tree-Ring Width, Tracheid Dimension and Wood Density Variation;
27. Kondrashov, L. International Ecological Collaboration in Russian Far East;
28. Petrova, E.A., Vorobjeva, N.A. The Character of Genetic Variation in Siberian Stone Pine Seedlings;
29. Pisarenko, A.I. Estimation of obtaining a "zero" carbon balance for the forest of European Russia;
30. Romanova, L., Yermolaeva, M. Change of Composition and Maintenance of Free Amino Acids in Tissues and Organs of Pinus sylvestris Under Flooding;
31. Sapozhnikov, A.P. About necessity of new approach to pyrological estimation of forests;
32. Selikhovkin, A., Kozlov, M. Insect Outbreaks in North West of Russia;
33. Semakova, T.A., Shabunin D.A., Maslakov E.L. The Loss of Pine Stand Stability in the Northwest of Russia;
34. Sergienko, V.G. Influence of Silviculture Measures on Preservation and Productivity of Wild Berry Plantations;
35. Strakhov, V.V. Ecosystem Management of Forests In Russia: Place of The Forest Certification;
36. Strakhov, V.V. Ecosystem Management of Forests In Russia: Strategy of Forest Protection;
37. Sudachkova, N.E., Milyutina, I.L., Semenova, G.P. Biochemical Response of Siberian Conifers to Water Deficit;
38. Sukhikh, V.I., Teplyakov, V.K., Shalaev, V.S. High technologies for Russian forestry;
39. Tretyakova, I.N. Reproductive Potential of Siberian Forest Forming Conifer Species in Destructive Forest Ecosystems;
40. Vetrova, V.P., Polyakova G.G., Stasova V.V., Pashenova N.V., Konstantinov M.Yu. Estimation of Conifer Resistance against Pests and Fungal Diseases;
41. Volokitina, A.V., Nozhenkova, L.Ph., Sofronov, M.A., Nazimova, D.I. Prognosis of emergency situations under wildland fires;
42. Vorobjev, V., Savchuk, D., Vorobjeva, N. and Zhao Guang-yi. Cyclic and Morphological Aspects of Relationships between Growth and Cone Production in Stone Pines of Eurasia;
43. Vorobjeva, N., Vorobjev, V., Zotikova, A. and Sobolevskaya, J. The Growth and Initial Photosynthetic Processes of Pinus sibirica;
44. Yakovlev, A.S., Yakovlev, I.A. Conservation and Management of Oak Genetic Resources Impacted by Oak Decline in Russia;
45. Yakovlev, I.A. Study on Variability within Pedunculate Oak Populations in the Middle Near Volga Region of Russia and Conclusions for Gene Conservation and Silviculture.

Interesting facts

At the Congress, it was decided to have a new logo of the Union designed to visualize the IUFRO position in the world and to up-date the logotype. After this Congress, a new logo was designed, introduced, and in 2002, it was used or the first time.

In principle, the new emblem symbolizes the following three basic things: sustainability, forest research, and internationality – the global scope of the Union. “The logo expresses sustainable

development, thus reflecting the predominant spirit of the late nineties of the past century and the beginning of this century. The sustainable development is represented by semicircles or water, and a leaf which is generic; it also stands for research, represented by the semicircles or tree rings indicating a tree's age; and it illustrates internationality by the semicircles, which stand for the globe" (Schmutzenhofer 2002, p.3; IUFRO e-Notes 2002).

In 1998, the IUFRO Board organized a competitive selection process to have a new IUFRO logo developed. It was open to employees of our Member Organizations. IUFRO received several fine proposals, and the best one was awarded at the Kuala Lumpur Congress. However, additional solutions were asked for from several professional designers. Finally, the IUFRO Board accepted the logo, created by Sandra Bernier, a graphic designer employed by the Canadian Forest Service who kindly provided IUFRO with the logo free of charge. Roberta Gal, another graphic designer with CFS, worked on the new letterhead and newsletter designs under the guidance of Francine Bérubé, Publishing Officer. Dr Seppälä thanked all three for preparing the new logo design and image package, and the CFS, particularly Gordon Miller, Member of the IUFRO Board, for their valuable contribution (Seppälä 2003, p.13).

Dr. Seppälä also said that a good logo and other visual products could create a good corporate image. The new image is part of IUFRO's strategy that aims at showing IUFRO as a modem organization. This should make it easier for the Union to approach new members, collaborators and donors; it changed the word "forestry" to "forest" in the name of the organization. IUFRO had lived with the old logo for 33 years, and many of its members continued to love the famous "sky rocket", but they were expected to fall in love with the new logo, too (ibid., p.13).

The Congress in Malaysia prepared various souvenirs, and released collectible stamps and envelopes with the special sign of the first-day cover. The envelopes and stamps were designed by Peter Chuah P.K., Malaysian artist.

It should be noted that the Congress promotion activities started in 1995. A video of Malaysia was shown to the delegates of the 20th IUFRO World Congress in Tampere. Many souvenirs were given to the participants and they were informed about Malaysia as a good Congress destination. It was followed by a set of pre-Congress information products: the first Congress announcement (1997), Congress Information Package (1998), and Congress Registration Package (1999) in 12,000 copies each. In addition, 5,000 IUFRO Congress posters and 3,000 car stickers were distributed. Much information was delivered via IUFRO News, press releases at various international meetings, TV and radio talks, and scientific articles in newspapers, etc.

Part Seven
New Millennium (2001-2014)

The end of the 20th century was marked with a major international event in 2000: at the Millennium Summit, the leaders of the countries ratified the United Nations Millennium Declaration, and in 2001, all countries adopted the document, entitled *Millennium Development Goals* (MDGs). One of the MDGs is to ensure environmental sustainability, including nature conservation, through including the sustainability principles into public policy in order to prevent depletion of resources and to halt biodiversity loss. The MDGs became the first document with clearly articulated success indicators to see achievements after some time: by 2010-2020.

The forest as one of the most valuable resources for the world's development increased its visibility as the habitat and the source of food and medicinal plants, building materials, fuel and other products and services, particularly needed to meet MDG-1 (to eradicate extreme poverty and hunger) by 2015, and MDG-7 (to ensure environmental sustainability). Yet, a few years after the adoption of the MDGs, the value of forest, as an instrument for achieving the goals, was still underestimated (Brinkman, Duijl and Armitage 2007; Mayers 2007).

On the other hand, the relations between wood producing and wood consuming countries acquired a new ring, specifically, in the context of response to illegal forest activities: illegal logging and timber trade, unauthorized use of non-timber forest resources, etc. in developing countries and in countries in transition. The weakness of economic development, shortcomings of law enforcement, corruption and related problems triggered the international processes, aimed at improving Forest Law Enforcement and Governance (FLEG)[273], and Forest Law Enforcement, Governance and Trade (FLEGT)[274]. The FLEG Ministerial Conferences were held in Bali, Indonesia (2001), Yaoundé, Cameroon (2003) and St. Petersburg, Russia (2005) with active participation of all stakeholders: governments, non-governmental organizations (NGOs), business communities, academia, donor agencies, mass media and others (ENA-FLEG 2003; IUCN 2003; Teplyakov *et al* 2005; FAO 2010). To study this phenomenon, in 2005, IUFRO established its Task Force on Illegal Logging and FLEG (T)-Processes which held its first meeting in St. Petersburg, Russia, in February 2006.

In 2001, in fulfilment of UN Economic and Social Council Resolution 2000/35 inviting the heads of relevant UN, international and regional bodies to form a partnership on forests, the Collaborative Partnership on Forests (CPF) was established. IUFRO, along with FAO, IUFRO, IUCN and other 11 organizations comprising the CPF work in support of the UN Forum on Forests (UNFF) and its Member States, with a view to strengthening cooperation and coordination among the CPF member organizations (CPF 2013). In this network, IUFRO is responsible for scientific support of a number of CPF's activities, including the Global Forest Information System (GFIS), developed by the IUFRO Task Force. GFIS was launched in 2002 at the IUFRO European Conference in Gmunden, Austria, and presented at the 12th World Forestry Congress in Quebec, Canada, in September 2003 (GFIS WP 2005). It supports more than 400 partner organizations around the world. Russia is an active collaborator in the development of the Russian version of GFIS (see Chapter 33 for details).

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[273] Forest Law Enforcement and Governance (FLEG): the process was initiated, primarily, by the World Bank.

[274] Forest Law Enforcement, Governance and Trade (FLEGT): the process was initiated, primarily, by the European Union.

In addition, within the CPF framework, IUFRO leads the Global Forest Expert Panels initiative (GFEP)[275]. The GFEP initiative was launched in April 2007 to provide objective and independent scientific assessments of key issues in order to support more informed decision-making at the global level.

Since 2007, IUFRO has coordinated five Global Forest Expert Panels, producing influential reports on the following topics: *Adaptation of Forests and People to Climate Change* (2009); *Embracing complexity: Meeting the challenges of international forest governance* (2010); *Understanding relationships between biodiversity, carbon, forests and people: The key to achieving REDD+ objectives* (2012); *Forests, Trees and Landscapes for Food Security and Nutrition* (2015); and most recently, *Illegal Logging and Related Timber Trade – Dimensions, Drivers, Impacts and Responses* (2016), consecutevly presented in a number of the IUFRO World Series publications (Seppälä, Buck and Katila 2009; Rayner, Buck and Katila 2010; Parrotta, Wildburger and Mansourian 2012; Vira, Wildburger and Mansourian 2015; Kleinschmit, Mansourian, Wildburger and Purret 2016).

It should be noted that such global advisory groups, established by the CPF, have their own backstories, related to a number of worldwide consultations on specific issues, such as the World Consultation on Forest Genetics and Tree Improvement[276] (Stockholm, 1963; Washington, 1969; Canberra, 1977; Beijing 1998)[277]; FAO/IUFRO World Technical Consultation on Forest Diseases and Insects (Oxford, 1964; New Delhi, 1975); World Consultation on Forestry Education and Training (Stockholm, 1972); International Expert Consultation on Non-Wood Forest Products (Jakarta, 1995), to name just a few.

The new Millennium was marked with various other initiatives with IUFRO actively and meaningfully contributing to their implementation through its Congresses, multilateral meetings, and participation in international and inter-governmental events.

The International Union of Forest Research Organizations celebrated its 110th anniversary (Buck, Burger and Wolfrum 2004). At its meeting, the Executive Board instructed the IUFRO Secretariat to organize its celebration. In addition, the Secretariat Headquarters moved from Schönbrunn to Mariabrunn where the Austrian Federal Office and Research Centre for Forests (BFW) were located. The Austrian Government supports IUFRO through providing financial support and premises for its Secretariat.

The celebration event was held at the Ceremonial Hall of Mariabrunn, exactly in the place where the idea to create IUFRO was born in 1890! By its 110th anniversary, IUFRO released a poster, depicting the time of the Union establishment, its structure and Presidents. The first poster of this kind was released for the 100th Anniversary of IUFRO, at the IUFRO Centennial Congress in 1992.

The International Symposium on the theme: Forest Research – Challenges and Concepts in a Changing World was held on October 9-10, 2002, after the Ministerial Conference on the Protection of Forests in Europe (MSPFE) in Vienna, Austria. The purpose of the Symposium was to discuss the concepts designated to help address problems of forestry and related industries. Thus, it was necessary to enhance the synergy between research and policy-making in the economic and legislative fields. The Symposium also revealed the current difficult situation in forest research, characterized with decreased financial support for research due to budgetary constraints, as well as increasing demand for research related to climate problems and structural changes (Buck, Burger and Wolfrum 2004).

[275] Global Forest Expert Panels (GFEP). For more details and publications, see http://www.iufro.org/science/gfep/

[276] Later on: the World Consultation on Forest Tree Breeding

[277] In 1998, the IUFRO held the 4th International Consultation on Forest Genetics and Breeding in Beijing.

Professor Risto Seppälä, IUFRO President, welcomed 123 participants from 20 countries on three continents, representing forest research institutes and international organizations, including the United Nations Forum on Forests, UN European Economic Commission, MCPFE Secretariat and others. The Symposium participants noted the high quality of presentations and excursion. The Symposium was greeted by the UN FAO, IUFRO members and other organizations.

In the first part of the meeting, the participants were welcomed by the leadership of Austria, the host country, and IUFRO, and heard presentations on the core theme of the event and about the history of IUFRO. The main part of the Symposium consisted of three plenary thematic sessions on economics, science and policy. Altogether, 14 papers were presented. At the third thematic session, Victor K. Teplyakov (Russia) made a presentation, called: International Goals of Forest Conservation in the Russian Context. During the final part of the Symposium the identified issues were discussed.

The excursion was held on October 10, 2002, and enabled the participants to continue the lively discussion of the issues raised. They visited the Stora Enso sawmill company in Austria (to the south of Vienna); the company's history dated back to the sawmill of the Schweighofer family); its annual capacity for wood processing was estimated at about 500,000 m^3 of wood. Another interesting destination was the Vienna Water Protection Zone (VWPZ), e.g., the forest catchment area of over 32,000 ha in Rax-Schneeberg (Rax-Alps) with a high quality watershed management system, oriented predominantly to the forest management for water conservation forests, supplying Vienna with drinking water. Spring water came to Vienna via 100-kilometer long waterway under natural gravity forces[278]. It is worth to note that forestry was supported with allocations from the Vienna city budget – a certain amount of money for each cubic meter of clean water came out of the forest.

It should be mentioned that Dr. Jochen Kleinschmit (Germany) and Dr. Leon Mejnartowicz (Poland) received IUFRO Distinguished Service Awards in August and September 2002 respectively for their outstanding work in genetic research and their contribution to IUFRO Division 2.

The participants expressed their deep gratitude to the organizers of the Symposium.

It should be also noted that the year of the 110th anniversary of IUFRO was marked with the official introduction and the first use of the new IUFRO logo, as well as two major IUFRO conferences on forest protection (McManus and Liebhold 2003) and on evaluation of the experience of economies in transition (Le Master, Herbst and Schmithüsen 2003).

[278] The First Vienna Spring Water Main was put into operation on October 24, 1873.

Chapter 28
Congress XXII – August 8-13, 2005, Brisbane, Australia

The main sources of information for this Chapter were the Report of the Congress (IUFRO 2005b), abstracts of papers (IUFRO 2005c), and personal archives and memoirs of the authors of this book who participated in the Congress (Тепляков и Шалаев 2005). It should be noted that it was for the first time, the Congress Organizing Committee and IUFRO decided against publishing multivolume proceedings with papers and to confine to abstracts of the papers. A colourful booklet with the Congress Program (IUFRO 2005a), abstracts and CD was included into the Congress participants' registration package. The work of the Congress was covered in the daily bulletins (Congress News), promptly prepared by the Brisbane Convention & Exhibition Centre (BCEC) and distributed to the participants.

Overview

The 22nd IUFRO World Congress was the first IUFRO Congress in the fourth continent – Australia, so, it was the first IUFRO Congress in the Southern Hemisphere.

The Congress theme was worded as *Forests in the Balance: Linking Tradition and Technology*. It was attended by about 2,100 registered participants from 96 countries.

The largest number of participants were from Australia (354 people), followed by USA (195), Japan (113), Canada (111). From Russia, only seven people were registered at the Congress.

During four days prior to the Congress, scientists from many countries, including Russia, participated in four special training courses on actions aimed at reducing poverty through sustainable forestry. The workshops were organized by IUFRO SPDC and provided training in writing project proposals, using new information technology in forest science, developing communication skills to discuss forest issues, etc. Just before the opening of the Congress, the traditional tree planting ceremony took place in the Southbank Parkland, Brisbane. The highlight of the ceremony was planting of extremely rare Wollemi Pine (*Wollemia nobilis*) known only through the fossil records[279].

The Congress agenda included 147 meetings of all levels, about 643 presentations (papers) and 843 posters selected from 2,456 unique abstracts, as well as an in-Congress excursion (Thursday, August 11, 2005) and five post-Congress tours, including those to foreign countries – New Zealand, Papua New Guinea and others. Russian scientists submitted 21 abstracts.

Scientific program

The Opening Ceremony was held on August 8, 2005, at the BCEC and started with the welcome addresses of John Howard, Prime Minister of Australia; Peter Beattle, Premier of Queensland; Risto Seppälä, IUFRO President; John Innes, Chair, Congress Scientific Committee; Dr. Gary Bacon[280], Chair, 22nd IUFRO World Congress Organising Committee, who warmly welcomed the delegates and wished them to have successful work.

[279] It was discovered in Australia in 1994.

[280] Dr. Gary Bacon replaced Dr. Russell Haines, initiator for the Australian proposal for the Congress, in this position shortly after the Congress in Malaysia.

During the Opening Ceremony, the IUFRO Scientific Achievement Award (SAA) was granted to 10 winners: Professor Joseph Buongiorno, Dr. David Karnosky, Professor Rahandran P.K. Nair, and Dave L. Peterson (all from the USA); Dr. Shashi Kant (India); Dr. Vitor Lieffers, Dr. John R. Spence and Dr. S.Y. (Tony) Zhang (all from Canada); Rémy Petit (France) and Dr. John Turner (Australia).

Then, Dr. Gary Bacon welcome the participants on behalf of the Congress Organizing Committee and demonstrated a set of stamps of the *Native Trees* series with the images of the five main tree species in Australia, as issued on the occasion of the Congress.

On Monday, August 8, 2005, Ariel E. Lugo, Director, International Institute of Tropical Forestry, USDA Forest Service (Puerto Rico) made his keynote presentation, highlighting *Conservation Challenges to Tropical Forestry*. His presentation was followed with a panel discussion with Robert Nasi, Coert Geldenhuys and David Lamb. Tropical forestry had become an urgent issue about 25 years ago. The debate was structured around forest conservation and forest biodiversity conservation. It was noted that some progress had been achieved in such areas as understandding of the role of tropical forests, thus, it had resulted in increasing rates of tree plantation establishment, forest rehabilitation and restoration, agroforestry and conservation activities, and the notion of ecosystem services had been recognized and promoted, keeping in mind forest conservation rather than only forest resources and goods. Meanwhile, such problems as the anthropogenic threat of deforestation, forest degradation and land conversion remained unresolved. For this reason, a fundamental research task was to determine to what extent these changes in conditions were related to changes in species composition and success of invasive species (IUFRO 2005b, p.13).

On Tuesday, August 9, 2005, Eugene van As, Sappi Limited (South Africa) made a keynote presentation on *Importance of Wood Science and Forest Science in Helping Developing Countries Develop Viable Forest Industries*. The speaker made a broad overview from the background and a perspective of non-scientist. He showed a global picture of growing forest consumption and, hence, deforestation and afforestation, taking examples from all continents. Concerning tree planting, he stressed: “In South Africa, for example, by 1940, there was only about 180,000 hectares of pine only, a few hundred thousand hectares of eucalyptus existed in Brazil, and there was virtually no pine in Queensland. But today plantations cover millions of hectares in Asia, 3.5 million in Africa and nearly 10 million in South America. Sustainable forestry practices are of course becoming the norm in the developed world but many of those forests are self-regenerated. The developing world was planting trees for fuel, but increasingly now for lumber and more particularly for the pulp and paper industry” (IUFRO 2005b, p.14).

Then, he demonstrated the changes in tropical forestry from biological (forestry) and technological (manufacturing) points of view, e.g., linking increased growth rates with tree breeding and introduction of fast growing species in many areas, etc.; timber industry began using more sophisticated technologies and equipment; a holistic approach to the concept dealing with lignin from timber, increasing fibre/lignin ratio etc. and its impact on the profitability of timber industry and return of capital; globalization of timber industry and markets, and so on.

Joseph Gosnell, President, Nisga’a Tribal Council, New Aiyansh, British Columbia (Canada) delivered his keynote speech about *Harvesting and Management of Natural Resources under the Nisga’a Final Agreement on August 10, 2000*. The Nisga’a final agreement was signed on April 27, 1999 by Nisga’a Nation (Joseph Gosnell, Nelson Leeson and Edmond Wright) and the Province of British Columbia (Premier Glen Clark) and on May 4, 1999, by the Minister of Indian Affairs and Northern Development (Jane Stewart) for the Canadian federal government. The Nisga'a Treaty gave control over the land, forest and fishing resources, and settlements on almost 2,000 km^2 of the Nass River valley (Nisga’s Final Agreement 1999). Chief Gosnell depicted forestry and forest

management as a holistic land management practice of the First Nations, followed for centuries. According to the Agreement, annual allowable cut was set at 165,000 m^3, including 10,000 m^3 authorized by Nisga'a, and starting from the sixth year of the Agreement it totalled 135,000 m^3, which was fully authorized by the Nisga'a. Forest fire control and forest health were the responsibility of Nisga'a. In general, the Forest Management Plan was built on the principles of sustainability, formulated by Nisga'a ancestors as "culture and economy that respected and protected the natural world". Forest management included, *inter alia*, the following major elements: timber resources, resource inventories, silviculture, roads, non-timber forest products, cultural forest resources, recreation site management plans, forest fire management, insect and disease control, safety, integrated resource management plans, and employment.

On August 12, 2005, Dr. Lisa Sennerby Forsse, Secretary General, FORMAS[281] (Sweden) made a keynote presentaion about the *Role of Science in Developing Sound Environmental Policies that Transcend National Boundaries*. The speaker began with three global issues: acidification, stratospheric ozone and climate change, viewed from the angle that "research made a difference in environmental policy". Then, she passed to other challenges such as poverty, water and biodiversity loss, referring to international milestones from the UN Conference on the Human Environment in Stockholm in 1972 to the present-day MDGs (2005). Talking about obstacles for the cooperation between science and policy-makers, the speaker named academic conservatism, lack of research competence in governments, lack of uncertainty of ownership, reluctance of the political system to take risks, and lack of fora for a dialogue at the national level. In conclusion, Dr. Sennerby Forsse gave some hints on how to improve the relations between science and policy-makers.

On August 13, 2005, Tricia Caswell, CEO, Victorian Association of Forest Industries, (Australia), delivered her keynote speech entitled *Contribution of Forest Industries to Global Sustainability: Beyond Grenades and Blockades*. She made a "four magics" connection by discussing "tree magic" as old-growth and re-growth, "wood magic", "paper magic", and "forest industries magic" via the "Planer magic," represented by economy, ecology and society. She identified the challenges and opportunities, including potential scenarios of maintaining global sustainability by different institutions via proper governance and industrial transformation, taking as an example the VAFI (Victorian Association of Forest Industries) and its vision towards 2025. She also said: "The year 2005 saw a major change in the way that sessions and papers were solicited for the IUFRO World Congress. Instead of allocating sessions across the IUFRO Divisions based on the number of units within each Division, a competitive process was instigated with potential session organizers having to demonstrate how they would address one or more of the ten themes identified by the Congress Scientific Committee and overall IUFRO membership as being important. (…) A second change was to disassociate specific Research Groups with specific sessions. Research Groups were not prevented from identifying with particular sessions, but sessions organized jointly by several groups were encouraged. (…) As a result of this change, a number of sessions were organized by individuals with no previous affiliation with IUFRO. This is seen as a positive development" (IUFRO 2005b, p.27).

The following 10 Sub-Plenary Sections addressed issues which were in line with the scientific program of the Congress; and each of them involved from 6 to 27 working units with merged scientific contents, for example, 1. Integrating approaches to achieve multiple goals: Intensive management, extensive management or conservation? Session organizer (SO): Klaus von Gadow (University of Göttingen, Germany).

[281] FORMAS is the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, established in 2000, and designated to "encourage and support scientifically significant research related to sustainable development".

Each session discussed a number of papers. The first sub-section of the same name (Integrating approaches to achieve multiple goals) was chaired by Dr. Klaus von Gadow and discussed the following papers: Tuula Nuutinen (Finland) about the potential of integrated stand and forest level optimization; Juan-Manuel Torres-Rojo (México) about the challenges and potentials connected to the management of common property forest lands; Chris Goulding (New Zealand) about the role of research in the design of plantation management systems to meet social, ecological and economic requirements at once; Martina Mund (Germany) about how carbon pools vary by forest management types, and Robert Szaro (USA) about the role of large-scale experiments when adapting management actions for multiple goals. Selected papers of this session were published in the *Allgemeine Forst- und Jagdzeitung*, Germany (IUFRO 2005b, p.28).

This Sub-Plenary Session discussed decision-making on forest area management as well as human factor to be taken into account when deciding on management practices, on environmental certification, on the use of forests as a sink of greenhouse gases, etc. The discussions covered other 11 sub-themes, related to similar approaches:

- Biodiversity and plantations – oxymoron or opportunity? Integrating approaches to achieve multiple goals – intensive management, extensive management and conservation (SOs: Alain Franc, INRA, France; Jeff Sayer, WWF International, Switzerland; and John Parrotta, USDA Forest Service, USA);
- Wood quality from intensive management (SO: Dave Cown, ENSIS, New Zealand);
- Integrating wood production within sustainable forest management (Session Organizer: Robert Deal, USDA Forest Service);
- *Designing policies for the protection of biodiversity in forested environments* (SO: George Hoberg, Faculty of Forestry, University of British Columbia, Canada);
- Environmental planning for harmonizing forest biodiversity conservation and sustainable development (SOs: Dr. V.B. Mathur and Dr. Asha Rajvanshi, Wildlife Institute of India, Dehra Dun);
- *Uneven-aged silviculture: From temperate to tropical forests* (SO: Kevin L. O'Hara, University of California – Berkeley, USA);
- Properties and utilization of plantation timber - Plantation wood as a substitute for native forest resources (SOs: Kee-Seng Gan, FRIM, Malaysia; and Gary Waugh, University of Melbourne, Australia);
- Modelling multi-dimensional forest dynamics for multi-purpose (SO: J.P. Skovsgaard, Forest & Landscape Denmark);
- *Monitoring and indicators of forest biodiversity - towards a harmonized system at country, landscape and stand scale* (SOs: Tor-Bjorn Larsson, European Environment Agency; Anna Barbati and Marco Marchetti, Accademia Italiana di Scienze Forestali, Italy; and Frits Mohren, Wageningen University and Research Centre, The Netherlands);
- *Managing forests for biodiversity conservation* (Session Organizers: Dr. S.A. Hussain and Dr. Ruchi Badola, Wildlife Institute of India, Dehra Dun);
- *Managing forest landscape mosaics for production and conservation* (SOs: Geoffrey Smith, Queensland Environmental Protection Agency, Australia; and David Taylor, Queensland Department of Primary Industries and Forestry, Australia).

Another Sub-Plenary Session and sub-sub-sessions were similarly organized.

Utilizing genetic resources to further *sustainable forestry. Threats to forest genetic resources and approaches to gene conservation*. SO: Judy Loo, Canadian Forest Service, Natural Resources Canada. This Sub-Plenary Session addressed conservation and utilization of forest genetic resources, including the sensitive issue of genetic engineering in forestry.

Meeting the challenge of climate change. SO: Dr. Paolo Cherubini, WSL Swiss Federal Research Institute, Switzerland. The theme of this session was the role of forests in combating negative consequences of climate change. In particular, carbon sink monitoring in forests, prospects for forest projects to be accepted by the technology market to reduce greenhouse gas emissions, taking into account the role of forests in mitigating climate change under the post-Kyoto agreement for the period after 2012.

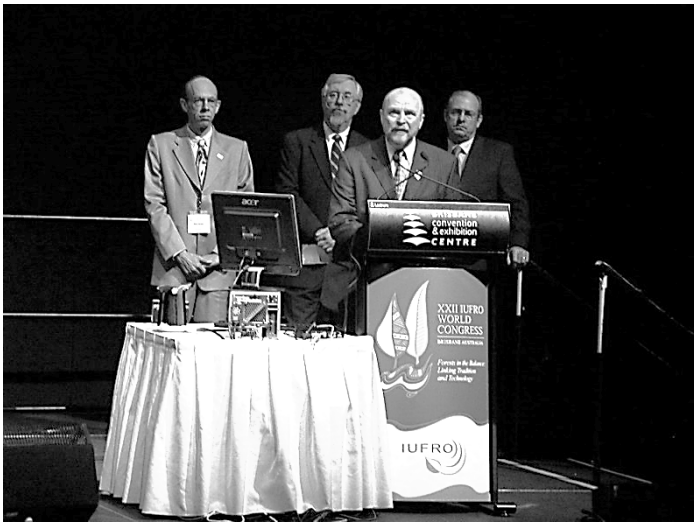
Promoting development through improvements to the forest – wood and products chain. SOs: Howard Rosen, USDA Forest Service, USA; and Lauri Valsta, University of Helsinki, Finland. This session discussed sustainable forest industry, in particular, new approaches to marketing of forest products, promotion of non-timber forest products in the market, and recognition of forests as a holistic economic organism. Thematically, this session echoed the fifth, sixth and seventh sessions on involvement of aboriginal peoples in operations in the forests where they live, to increase the value of forest products by using modern technology and best practices for sustainable forest management.

Involving indigenous groups in forest science and forestry. SO: John L. Innes, Sustainable Forest Management Research Group, University of British Columbia, Canada.

Increasing the value of forests through innovative products and technologies. SO: Hans Rudolf Heinimann, Swiss Federal Institute of Technology (ETH), Switzerland.

Demonstrating sustainable forest management. SOs: Piermaria Corona (University of Tuscia, Italy) and Marco Marchetti (University of Molise, Italy)

Sustaining forests: A duty for forestry and society? SO: Max Krott, Georg-August University of Göttingen, Germany. One of the speakers was Victor K. Teplyakov, Forest Programme Coordinator, IUCN Office for Russia and CIS. He spoke about the Russian forest management practices of partnership with civil society.



[Sub-Plenary Session *Sustaining forests: A duty for forestry and society?* Brisbane, Australia, 2005. Courtesy of G. Bacon.]

Realizing the environmenttal benefits of forests. SOs: Niels Elers Koch, Danish Centre for Forest, Landscape and Planning, Denmark; and Klaus von Gadow University of Göttingen, Germany. This session discussed the ecological role of forests: forest areas were regarded as tools for biodiversity conservation, water protection, recreation, protected areas, etc. Another issue raised was the impact of globalization on the world's forests and people's awareness of their economic and ecological value in a changing environment.

Advancing the role of communication, education and capacity building in the future of forestry. SO: John Innes, Sustainable Forest Management Research Laboratory, University of British Columbia, Canada.

The *President's Discussion* on the theme *Research to cope with global change* took place in

the afternoon of August 10, 2005. The discussion was an open exchange of opinions about IUFRO's future development. President Risto Seppälä chaired this meeting, and its six speakers were: Peter Mayer, Austria, IUFRO Executive Secretary; Joseph R. Cobbinah, Ghana, Director General, Forest Research Institute; Razak Mohd. Abd. Ali, Malaysia, Director General, FRIM; Lisa Sennerby Forsse, Sweden, Secretary General, FORMAS; José J. Campos, Costa Rica, CATIE[282]; and Thorry Gunnersen, Australia, Chair, Forest and Wood Products Research and Development Corporation.

At that meeting, the report of Dr. Peter Mayer: *Global Situation and Trends in Forest-Related Research* was of particular interest; it was based on opinions of scientists from around the world. The presentation still remains relevant; therefore, its main ideas are presented below. The poll-survey of member organizations and IUFRO officers was held on the eve of the Congress in Brisbane. The numbers of respondents by region was distributed as follows (in %): Europe – 49.4; North America – 18.5; Latin America – 8.3; Africa – 1.2; Asia – 18.4; Western Pacific – 4.2. It was noted in the report that even during the preparatory work for the survey, IUFRO member-organizations and scientists had identified the most important priorities for global forest research, and confirmed them during the Congress. The responses enabled to find the main areas of forest research, prevailing 10 years ago, on now and in the near future (see Table below).

10 years ago	Today	In future
– Air pollution	– Agroforestry	– Adaptation of forests to climate change
– Biodiversity	– Climate change	– Biotechnology
– Forest dieback	– Carbon sequestration	– Forests and landscape (and restoration)
– Forest operations	– Forest restoration	– Forests and water
– Genetics	– Plantations	– GMO
– Sustainable forest management (SFM) and certification	– Policy and governance	– Reduced impact logging
– Wood quality	– Sustainable use of wood and non-wood goods and services (NWGS)	– Recreation and valuation of NWGS
	– Wood consumption	– Social aspects (including gender, forest workers, communication)

It is noteworthy that the survey identified the main partner-sciences for forest research (ecosystem research; environmental sciences; genetics; modelling; policy science; soil science; and wood science) and the most promising future partner-sciences for forest research (agroforestry; biotechnology; economical sciences; environmental science; health sciences; microbiology; social and policy sciences). The study also showed that the major driving forces for forest research were: scientific evidence (66%); national policy decisions (46%); interest of stakeholders (35%); international policy decisions (33%); interest of donors (21%); and some other factors such as effects of global markets, public opinion, etc.[283]

The national budget of different levels provided 53% of the total funding, 17%, came from national private institutions, 15% from international public funds (mainly grants), 9% from international private funds, and 6% from other sources. Many scientists (72%) believed that the role of IUFRO for them was very significant, many of the respondents believed that IUFRO played an important role for collaboration (73% answers with high and medium level of appreciation).

[282] Centro Agronómico Tropical de Investigación y Enseñanza – CATIE (the Tropical Agricultural Research and Higher Education Centre).

[283] A respondent could choose from several response options, thus, the sum is not equal to 100%.

Nevertheless, in a broad sense, most of forest institutes wanted to maintain their independence (73% of the answers) and to develop their own scientific bases, and just slightly over a quarter (27%) of them would like to merge with other institutions, addressing natural resources or environmental issues. That was largely due to changes in forest research funding with the general trend towards its reduction and increase of the funds coming from national public donors (85%), multilateral development cooperation (51%), national private donors (34%), bilateral development cooperation (21%), and international private donors (10%).

The conclusions of the study are presented below:

- Research priorities over the last ten years have shifted from more technical to environmental issues;
- For the future an increasing focus on social issues is expected;
- Infrastructure and financing trends for forest related research vary;
- A decrease in national public funding has taken place in many countries;
- A majority identifies national public funds as main funding source of the future;
- The role of IUFRO for science collaboration is rather positive;
- The answers received indicated that research priorities have shifted over the past ten years from more technical towards environmental issues. For the future, an increasing focus on social issues could be expected (IUFRO 2005b, p.128).

It became obvious that these trends reflected challenges of globalization faced by humanity. In view of the fact that forest is one of the main components of the global life-supporting systems, problems of forest research, of course, reflected the solutions, arising in the world of challenges.

During the discussion, especial attention was paid to insufficient research capacity in many developing countries. It was evidenced with the limited participation of African forest scientists in IUFRO World Congress. To address this issue, it was decided to make better use of regional networks and organizations, sponsors, etc., to increase the number of participants from African countries in future Congresses.

Another focus was on the need to activate research and dialogue with stakeholders on forest ethics. Specifically, it was noted that the principle of sustainable forest management provided a good basis for addressing global problems of forest ethics. The participants agreed that forest ethics should find its place in the IUFRO global network.

“Closing the meeting, Professor Seppälä thanked the speakers and participants for their contributions which had covered a wide range of topics that were crucial for research to cope with global change. He noted that the President’s Discussion had also provided important guidance for the work of IUFRO in the future” (IUFRO 2005b, p.130).

Another interesting event was the *Directors’ Forum* on August 10, 2005. It was meant “to (i) discuss common challenges and problems of forest research and education organizations, and how they can be overcome, (ii) and to consider existing and possible future approaches for intensified, interdisciplinary cooperation and the development of joint activities” (ibid., p.131).

The Directors’ Forum was the first of its kind with a global scope. It was jointly organized by IUFRO, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Cong-ress Organizing Committee under the chairmanship of Dr. Colin Dyer (Institute of Commercial Forestry Research, South Africa). Alexander Buck, IUFRO Deputy Executive Secretary, served as rapporteur.

At the Forum, presentations were made by Dr. Harald Mauser, Head, Austrian Federal Research and Training Centre for Forests, Natural Hazards and Landscape (BFW, Austria), who talked about challenges and activities to strengthen cooperation of European national forest research institutes; Dr. David Kaimowitz, Director General, Centre for International Forestry Research

(CIFOR, Indonesia) who spoke about the future of tropical forests and need to link science, markets and people; Dr. Ann M. Bartuska, Deputy Chief, USDA Forest Service (USA) who identified emerging areas for natural resources research and sustainability in the United States; Dr. Rick Ede, Chief, Forestry and Forest Products, the Commonwealth Scientific and Industrial Research Organisation (CSIRO, Australia) who highlighted the use of environmental research services (ENSIS) [284] as an good example of two national forest research organizations, joining their forces for the national benefit; and Professor James Lynch, Chief Executive, Forest Research (Great Britain) who pointed to the need to integrate approaches of forestry, bio-resources management and the OECD[285] to land management and utilization of land resources.

Dr. Dyer summed up the results of the lively discussion in his closing remarks. He stressed that the world was changing, and, therefore, forest science would have difficulty of balancing the needs and interests of many stakeholders in the forest sector with the requirement of high scientific quality of forest research. The discussion also revealed a tremendous opportunity for IUFRO to change the situation in the future as a forum to exchange best practices at the international level, particularly between developed and developing countries. In this regard, he suggested holding the Directors' Forum on a more regular basis.

At this Congress, there was one more novation: one more newly established IUFRO prize – the IUFRO Host Scientific Award – was introduced. It was presented by the Australian Minister for Forestry at the Opening Session. For the first time, this award was presented at the IUFRO World Congress in Brisbane during the special inaugural ceremony on Friday, August 12, 2005. In the presence of 135 delegates, two Australians – representatives of the host country – received this Award; they were: Dr. D. Garth Nikles and Dr. E.K. Sadanandan Nambiar. Garth co-founded the first IUFRO working party, focused completely on the tropics and was awarded an IUFRO Distinguished Services Award in 1996. Sadanandan Nambiar was the Chief Research Scientist and Science Director of CSIRO with an outstanding track record of conducting and disseminating multi-disciplinary research on sustainable management of pine and eucalypt plantation forests particularly in stress-prone landscapes (IUFRO 2005b, p.115). Both awardees presented papers about their major research: Dr. Nikles spoke about improvement of forest tree plantations using knowledge of biology and genetic variation - the 60 year Queensland experience, and Dr. Nambiar's presentation was called Forest, People and Poverty Reduction – Are we making a difference?

At the Congress, IUFRO Distinguished Service Awards (DSA) were handed to to the following scientists: Dr. Gary Bacon, Chair of the Congress Organizing Committee (Australia); Professor John Innes, Chair of the Congress Scientific Committee (Canada); Dr. Keith Rennolls, Deputy 4.03.00 – Informatics, modelling and statistics (UK), and Dr. Eric Teissier du Cros, IUFRO Vice-President Science (France).

In the inter-Congress period, the DSA was also received by Dr. Gerhard Mannsberger (Austria) in 2003; Professor Nikolay A. Moiseev (Russian Federation), Dr. John A. Youngquist (USA) and Dr. Hans-Jakob Muhs (Germany) in 2004, and Rodolphe Schlaepfer (Switzerland) and Dr. Howard Rosen (USA) in 2005.

The recipients of IUFRO Outstanding Doctoral Research Award (ODRA) are listed below (IUFRO News 2005):

- Dr. John G. Bellow (USA) for his studies on impacts of climate variability on agricultural systems;
- Dr. Eugénie S. Euskirchen (USA) for her study exploring how seasonal snow cover dynamics can affect the growing season length and net carbon uptake of high latitude forests using a large-scale terrestrial ecosystem model;

[284] Environmental scientific service (Ensis).
[285] Organisation for Economic Cooperation and Development (OECD).

- Dr. Christian Gamborg (Denmark) for his research within bioethics and sustainability aspects of forestry, natural resource and landscape management, agriculture, genomics and science-policy-dissemination interaction;
- Dr. Kyu-Suk Kang (Republic of Korea) for his work on forest genetics;
- Dr. Pablo García (Chile) for his experimental and theoretical research into the hot-pressing manufacture of wood-composite panels;
- Dr. Sofía Sánchez Orois (Italy) for her work on forest growth modelling along with the generation of management options, on the economical evaluation of management options and on the linear optimization of the forest management; and
- Dr. Bernard Slippers (South Africa) for his study of fungal-insect interactions in wood and wood products, especially relating to introduced pests and pathogens.

At the Closing Ceremony of the 22nd IUFRO World Congress on Saturday, August 13, 2005, in Great Hall of Brisbane Convention & Exhibition Centre, Dr. Gary Bacon expressed gratitude from the Congress Organizing Committee to the participants, staff and invitees; and the audience watched a nice video presentation of the Congress highlights from meetings and excursions, exhibition and refreshments, tree planting ceremony and sightseeing.

The Closing Ceremony included the ceremony of awarding the following winners of the Best Poster Award (BPA), led by Dr. Howard Rosen, Division 5 and Chair, BPA Selection Committee (citations, read by Dr. Karel Vančura):

- D1: Carl Höcke, Freiburg University, Germany for Poster #669: "Long-term effects of forest fertilization on ground vegetation in the northern Black Forest, Germany";
- D2: Tasmien Horsley, Terry Stanger, Sappi Forests Research; S. Johnson, University of KwaZulu-Natal, South Africa for Poster #18: "Overcoming biological barriers to hybrid seed production in Eucalyptus";
- D3: John Yarie, University of Alaska, Fairbanks, Alaska, USA for Poster #473: "Decomposition of coarse woody debris in the boreal forest of interior Alaska";
- D-s 4 & 6: Johanna Pohjola, Finnish Forest Research Institute; L. Valsta, J. Mononen, University of Helsinki, Finland for Poster #682: "Economic analysis of carbon sequestration on stand level";
- D5: Nigel Lim, Y. K. Pek, Sarawak Forestry Corporation, Malaysia for Poster #16: "Evaluation of five reforestation species for manufacture of oriented strand board";
- D5: Chih-Lung Cho, S.-Y. Wu, S.-U. Yeh, National Ilan University, China-Taipei for Poster #799: "Improvement of the acoustic properties of Sitka spruce with chemical treatment";
- D7: Eugene Hannon, N.T. Kittelson, J. J. Brown, Washington State University, USA for Poster #836: "Managing intensively grown, irrigated hybrid poplars based on clonal susceptibility to Poplar/Willow borer *Cryptorhynchus lapathi* (Curculionidae)";
- D8: Sophie Zechmeister-Boltenstern, M. Pfeffer; Forest Research Centre; A.Bruckner, University of Life Sciences; W. Foissner, University of Salzburg; E. Hackl, A. Sessitsch, Austrian Research Centres; N. Milasowszky, W. Waitzbauer, University of Vienna, Austria for Poster #521: "Soil biodiversity and nutrient turnover in different forest types of Central Europe".
- Task Force – The Role of Forests in Carbon Cycles, Sequestration and Storage: Michelle Slaney, Swedish University of Agricultural Sciences, Sweden; J. Medhurst, CRC/CSIRO Forestry, Australia; S. Linder, Swedish University of Agricultural Sciences, Sweden; G. Wallin, Goteborg University, Sweden for Poster #210: "Spring phenology of Norway spruce (Picea abies (L.) Karst.) at ambient and elevated [CO2] and temperature".

IUFRO President Risto Seppälä announced the International Council's Decisions (see the next section).

IUFRO Honorary Membership was granted to Professor Jeffery Burley (UK), Immediate Past President, Heinrich Schmutzenhofer (Austria), former Executive Secretary, and Les Whitmore (USA), former Vice-President Administration.

The New Board members were named and went up to the stage.

Then, the Congress adopted the Congress Resolutions, read by Dr Peter Mayer, IUFRO Executive Secretary, and was addressed by President-elect Professor Don Koo Lee, Seoul National University, and Republic of Korea.

Professor Lee, in particular, said: "We all share a common research interest for forests and trees. However, we have a variety of approaches and research interests connected to that. We are also facing various problems such as poverty issues and environmental degradation which includes water and air pollution, desertification, forest fire, illegal logging, unemployment, unbalanced jobs or work opportunities in terms of gender. There are even more severe issues we are confronted with such as war, terrorism, tsunami, landslides, and floods. While IUFRO will not be able to solve all of these problems we can strive towards providing scientifically sound information for tackling them. (…) During the period 2006-2010, I am going to implement the 5 I's: those are Inform, Involve, Ignite, Invite and Influence:

1) I am going to inform you about latest news.

2) I am going to involve you in activities related to IUFRO.

3) I am going to ignite your interest to join in the activities provided by IUFRO.

4) I am going to invite you all to meetings.

5) I am going to work toward increasing IUFRO's influence by providing scientific information to various bodies and organizations" (IUFRO 2005b, pp.102-103).

At the end of the session, there were two fabulous presentations: a performance of the Traditional Korean Dance Troupe as a 2010 Congress Presentation and Indigenous Farewell – Message Stick Presentation by Mr Geoff Binge, indigenous member of Congress Organising Committee in Brisbane.

Following the tradition, Dr Seung-Jin Suh, Director General, Korea Forest Research Institute made his address, and after Professor Risto Seppälä, IUFRO President officially closed the Congress, the IUFRO flag was lowered and handed over by President Seppälä to Dr. Suh as the representative of the 2010 Congress.

In the evening, delegates were invited to a Gala Farewell Party.

Organizational matters

Traditionally, the IUFRO International Council met twice during the Congress in Brisbane: on August 9 and 12, 2005. Chaired by Dr. Risto Seppälä, the meetings discussed IUFRO's future strategic goals and adopted key decisions for the period of 2006-2010.

First of all, the annual meeting of the IUFRO Executive Board (24 members) and the IUFRO Enlarged Executive Board (more than 50 members) was held; it was also attended by Division Deputy Coordinators, and Managers/Leaders of TFs, IUFRO Programs and Projects.

The agenda included: the Report of IUFRO President Risto Seppälä for 2001-2005, Election of President, Vice-Presidents and Members of the Board; Congress Resolutions, Venue of the Congress in 2010, Future policy and orientation of IUFRO, and Other items.

Under the first item of the agenda, a collective report of the IUFRO President, Vice-Presidents Science and Policy, and the Executive Secretary was delivered.

It was noted that in March 2001, the IUFRO Board had approved the Vision and Mission Statement for the Union, and that the Strategic Action Plan for 2002-2005, approved by the Board

in June 2002, had been implemented. President Seppälä stated that the number of IUFRO main member organizations had decreased from 539 in 1995 to 502 in 2005. He also noted that only in Europe, there were over 1,000 organizations, addressing forest issues. Although, the total number of members was more or less stable, he said that it was worrying that some long-time members had withdrawn their membership due to financial reasons. On the other hand, many members in rich countries were able to pay higher subscription for the services and benefits IUFRO provided. Consequently, in 2003, IUFRO had changed the membership fee structure in order to introduce social fairness and to take into consideration the financial ability of members to pay the fee (IUFRO 2005b, p.137). The Council also set a target to reduce financial dependence on membership fees that covered half of the Secretariat's operational budget, and to find new additional sources of income.

With regard to the International Council, it was noted that it was not very active. Thus, it was deemed necessary to develop mechanisms and mainstream them in the new IUFRO Strategy for 2006-2010. A representative of Austria, the country of IUFRO Secretariat residence, was included in the IUFRO Executive Board. Measures were proposed to improve the effectiveness of the Management Committee (MC).

Concerning the IUFRO Secretariat, it was noted: "In the beginning of the current period, the IUFRO Secretariat was suffering from a lack of resources and from unsatisfactory working conditions. Book-keeping and other financial activities were physically separated from the Secretariat. Relations between the Secretariat and the host organization, Austrian Federal Office and Research Centre for Forests (BFW), were rather formal and distant." To mend the situation, a new contract was signed with the Austrian Government for hosting the Secretariat in September 2003. It was said in the Congress Report: "This contract considerably widened the scope of contributions granted to IUFRO by the Republic of Austria by supporting more staff for the Secretariat and providing larger, newly renovated office space in Mariabrunn where the idea to establish IUFRO was born in 1890. When the Secretariat moved to the new premises, the financial management activities were transferred from Switzerland to Vienna." (IUFRO 2005b, p.138).

Another change was related to the fact that in November 2003, Heinrich Schmutzenhofer retired after 16 years of work as Secretary and, lately, as Executive Secretary, and Peter Mayer from Austria commenced his career as IUFRO Executive Secretary, having passed through an international selection process.

It should be mentioned that in 2000, the Secretary position was renamed into 'Executive Secretary' to reflect changes in duties, and in 2006, the name was upgraded to the status of the Executive Director to adjust the position with similar functions in other international organizations. In addition, since 2003 the Austrian Government has been providing IUFRO with Deputy Executive Secretaries to play an important role in science-based policy reporting for the United Nations Forum on Forests (UNFF) meetings and other international forest policy processes. Dr. Alexander Buck from Austria filled in this position.

Regarding research units, IUFRO operated via Divisions, Research Groups and Working Parties, i.e., had a discipline-based structure since 1971, and the core units of IUFRO remained the same. Meanwhile, the rapidly changing scientific and political environment did not allow for flexible and timely response, so, the problem was partially addressed through establishing Task Forces, Programmes and Projects.

Within the previous 5 years, three new Task Forces (on Carbon Sequestration, on Forest Biotechnology, and on Information Technology and Forest Sector) were set up. The Report read as follows: "There have been concerns that the Task Forces can diminish the importance of the Divisions and their Units. It has also been expressed that by having too many Task Forces, IUFRO might be placing too great an emphasis on short-term challenges at the expense of long-term scienti-

fic work. Sometimes it has proven to be difficult to terminate Task Forces although they are meant only for a limited period. In general, it can, however, be said that Task Forces have been an efficient way to react to emerging problem-oriented interdisciplinary issues. Several Task Forces have produced excellent results both scientifically and by contributing to policy processes" (IUFRO 2005b, p.139).

Both IUFRO programs (IUFRO-SPDC since 1983) and projects (SylvaVoc since 1996) remained ongoing.

In this regard, it should be particularly stressed that on August 2-5, 2005, IUFRO-SPDC with support of donor agencies, governments and the official Congress Scientist Assistance Programme organized four pre-Congress training courses, attended by 44 participants from 19 developing and developed countries of Africa, Asia, Latin America and Eastern Europe. The Course Programme included the following themes: (1) Use of information and communication technology tools in forest research; (2) International forest related initiatives and agreements and their implementation in the context of national forest programs – Linking research and science with practice; (3) Communicating forest research – Making science work for policy and management; and (4) Sustainable forest management criteria and indicators – Their enhancement through science.

In 2001, IUFRO launched its new Global Forest Information Service (GFIS) Program which that had been a Task Force since 1998. In 2001, the Secretariat began to publish the bimonthly E-notes. In 2005, this and the printed IUFRO News, that had been published already for more than 30 years, were merged into an electronic IUFRO News.

In addition, in 2004, the IUFRO website was restructured to make it more user-friendly and reflect benefits of IUFRO membership. Accordingly, new options such as *Member Zone* and non-*Member Zone* were introduced.

During the reporting period, IUFRO was active on the international arena, taking part in meetings of the UNFF, FAO, and Collaborative Partnership on Forests (CPF), joined by the Union in 2003 to become the last, 14th member of the CPF. "The problem in IUFRO's participation in international processes compared with other CPF members is that our Union is mainly a voluntary organization, and therefore, it is difficult to find IUFRO representatives to attend meetings regularly because IUFRO cannot pay the costs of participation" (IUFRO 2005b, p.141). The partnership agreements or MoU were signed with many international forest centres and institutes, including CIFOR, IUCN, WWF, APAFRI, ETFRN, IFSA, and others.

After the Congress in 2000 in Malaysia, IUFRO received comments about low numbers of students participating in IUFRO events. In response, the MoU between IUFRO and International Forestry Students' Association (IFSA) was signed in 2003. Based on this MoU, since 2004, a representtative from the IFSA has been participating in the IUFRO Board meetings as an observer. During the Congress in Brisbane, two students received the Student Award for Excellence in Forest Science. They were: Katja Eisbrenner (Germany) and Carlos Ruiz García (Bolivia). It should be especially noted that many students in different capacities were involved in the work of the Congress.

As for the external evaluation of the Union, IUFRO audits were conducted in 1987 and 1999. According to the Strategic Action Plan, in 2003, the Board initiated another review and it was conducted in summer 2004. The Review Panel was headed by Dr. Jag Maini. The report was submitted to the Board in October 2004. Major recommendations for the Union from the review were as follows: "expand the sphere of influence of the Union by increasing activities related to policy and human well-being. In this context, the Panel recommended developing strategies for communication, expanded scope, as well as streamlined structure and funding" (IUFRO 2005b, p.141). To follow the recommendations of the Review Panel, the Board decided to draft a new IUFRO Strategy for 2006-2010, and the International Council was invited to discuss the draft and advise the Board on follow-up steps.

The Draft IUFRO Strategy was available in its electronic form and was actively and openly discussed prior to the Congress. The Board received many concrete proposals, some of which were included in the draft further considerations at the Congress, other proposals were forwarded for decision-making in the Divisions or other IUFRO units, some of them were rejected as not directly related to IUFRO activities. The strategy emphasized the role of IUFRO as a Global Network for Forest Research Cooperation[286].

As for the IUFRO Statutes and Internal Regulations, it should be noted that in May 2003, the IUFRO International Council adopted the following revisions:

"1. Establishment of an Advisory Council as a new organ to function as a high level interface between IUFRO and its stakeholders, and to improve the Union's financial stability.

2. Adding the IUFRO Headquarters representative to the IUFRO Board as a voting member.

3. Revision of the functions of the Executive Secretary by including the administration of the Union's financial affairs in his/her tasks.

4. Changing the name of Treasurer to Finance Officer whose main responsibilities include chairing the Finance Committee and maintaining the Union's financial sustainability.

5. Revising the Honours and Awards Article to reflect the inclusion of new Awards" (IUFRO Statutes and Internal Regulations 2011, p.1).

In August 2005, IUFRO International Council adopted the following changes to the Statutes, which became valid on January 1, 2006:

"1. Changes in Statutes were required by the Austrian legislation after the amendment of the new Austrian legislation concerning associations ("Vereinsrecht").

2. The maximum number of terms of office of Research Group and Working Party Coordinators has been changed from two to three (Art. XIV). Working Party Coordinators and Deputy Coordinators will now also be mentioned in the Statutes accordingly (Art. XIV).

3. The terms "Executive Secretary" and "Deputy Executive Secretary" have been changed to "Executive Director" and "Deputy Executive Director" throughout the Statutes and Internal Regulations" (ibid., p.1).

At the Closing Ceremony, members of the new IUFRO Board were named.

New office holders were elected. Professor Don Koo Lee (2006-2010) from Republic of Korea was elected IUFRO President; Professor John Innes (Canada) became Vice-President Policy, and Professor Niels Elers Koch (Denmark) became Vice-President Science.

The new Board included Division Coordinators: D1 Silviculture – Björn Hånell (Sweden); D2 Physiology and Genetics – Bailian Li (USA); D3 Forest operations – Hans Heinimann (Switzerland); D4 Forest assessment, modelling and management – Margarida Tomé (Portugal); D5 Forest products – Cathy Wang (China – Taipei); D6 Social, economic, information and policy sciences – Perry Brown (USA); D7 Forest health – Mike Wingfield (South Africa); D8 Forest environment – Alex Mosseler (Canada).

The General Board Members were elected or nominated by the President, they were: Mohammed Ellatifi (Morocco); Vitor Hoeflich (Brazil); Roberto Ipinza (Chile); Su See Lee (Malaysia); Shirong Liu (China); Tohru Nakashizuka (Japan); Piotr Paschalis-Jakubowicz (Poland); Heinrich Spiecker (Germany); and Victor K. Teplyakov (Russia).

After a lively discussion, Seoul, Republic of Korea was chosen as the venue of the 23rd IUFRO World Congress in 2010. The IUFRO flag was handed to Dr. Seung-Jin Suh (Republic of Korea) from the Korea Forest Research Institute (KFRI) – a IUFRO member-organization that prepared Korea's bid for the Congress of 2010. Incidentally, Russia also prepared its proposal for

[286] Since that time, *IUFRO - The Global Network for Forest Science* is the motto of the IUFRO website.

the IUFRO Congress in 2010, but failed in the second round due to the insufficient development of the financial aspects in the bidding documents.

Resolutions

Two Congress Resolutions were adopted at the Closing Plenary Session: *Promoting Global Cooperation in Forest-related Research* and *Promoting Science for Decision-making*, they reflected the status of forest research in the world and determined potential strategic directions of its development in future, focusing, in particular, on the need to increase its proactivity (IUFRO 2005b, pp.148-149).

BRISBANE RESOLUTIONS

Resolution 1: Promoting Global Cooperation in Forest-Related Research

The 22nd IUFRO World Congress "Forests in the Balance – Linking Tradition and Technology" provided a unique forum to present the results of the collective global research related to forests and trees.

The Congress identified a range of issues where research could significantly aid the better understanding of forest-related problems, including the achievement of balanced approaches towards forest conservation and sustainable forest management; the adaptation of forests to climate change; the use of genetic resources and biotechnology to further sustainable forest management; the involvement of indigenous groups in forest science and forestry; increasing the value of forest and forest products through innovative technologies; and the role of education, communication and capacity building in ensuring a sustainable future for forests.

Driven by the desire to address these and other forest-related problems and to further strengthen IUFRO as a home for scientists and research institutions related to forests and trees, including those currently operating outside the IUFRO network, IUFRO and its members will work to:

1. *provide* an improved thematic structure and flexible mechanisms within our organization that allow us to address key issues relevant to forest scientists and their stakeholders and to respond to research questions that are emerging as a result of the ongoing changes in society and the global environment;
2. *continue to ensure* that our scientific work lives up to the highest quality standards;
3. *strengthen* the participation of scientists and research institutions of developing countries and countries with economies in transition in the activities of IUFRO, including through providing assistance in capacity development of scientists and research institutions;
4. *actively promote* gender mainstreaming and cultural diversity within IUFRO and support and encourage the participation of women, young scientists and students in IUFRO's activities;
5. *increas*e our cooperation with scientists and research institutes working in other scientific disciplines on forest-related research topics that cross the traditional boundaries of forest science;
6. *more actively communicate* our research findings within the scientific and educational communities;
7. *fully implement* the IUFRO Strategy 2006-2010 to position IUFRO as a truly global network of forest-related science knowledge and cooperation.

Resolution 2: Promoting Science for Decision-Making

The XXII IUFRO World Congress noted that, despite the scientific advances so far, the understanding of forest ecosystem dynamics and their relation to continuously changing

human demands and global developments such as population growth, migration, urbanization, technology changes and climate change remains incomplete, and that there continues to be a need for advancement of forest-related scientific knowledge.

In spite of that, the status and capacities of traditional forest research institutions and universities as well as the funding available to carry out forest research is decreasing in many countries, notably as a result of shifting priorities of policy and decision-makers as well as donors.

It is therefore essential that in the future resource inputs into science and technology are seen primarily as an investment in forest-related socio-economic development and in preserving forests as natural life-support systems for present and future generations.

Driven by the desire to provide relevant, scientifically sound information and advice to policy and decision makers and other stakeholders, IUFRO and its members will work to:

1. *enhance* the provision of relevant problem–oriented forest research results to policy and decision makers and other stakeholders, including the private sector, and encourage them to make better use of scientific outputs;

2. *increase efforts* to translate research results of the forest science community into language that is readily understood by policy makers and other stakeholders;

3. *further enhance* our contributions to the work of international processes and conventions such as the United Nations Forum on Forests, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the United Nations Convention to Combat Desertification, *inter alia*, through the active involvement in the Collaborative Partnership on Forests;

4. *contribute* to the possible establishment of an advisory body to international processes and conventions with the specific purpose of giving scientific advice on forest related issues similar to the Intergovernmental Panel on Climate Change in climate issues;

5. *further increase* partnerships and collaboration with international organizations and stakeholders;

6. *contribute* to reaching the Millennium Development Goals through science collaboration, capacity building and education activities aimed at reducing poverty and improving the livelihoods of forest-dependent people, and at ensuring environmental sustainability.

IUFRO Strategy for 2006-2010

It should be noted that following one of the central recommendations of the Review Panel, the IUFRO Management Committee drafted the IUFRO Strategy for 2006-2010 "with the assistance of the IUFRO Headquarters, in consultation with the members of the IUFRO Enlarged Board and the International Council, the participants of the XXII IUFRO World Congress, IUFRO member organizations and other organizations and individuals. It was adopted at the 45th IUFRO Enlarged Board Meeting on May 4, 2006 in Vienna, Austria" (IUFRO Strategy 2006, p.5). The Strategy consisted of two Parts and was titled:

IUFRO Strategy 2006-2010: *the Evolving Context for Forest Science.*

The three overarching Goals of the Strategy were:

GOAL 1: To strengthen research for the benefit of forests and people

1.1 To address the changing research needs and priorities related to forests and trees

1.2 To promote quality research, improve equity, and strengthen scientific capacity

1.3 To strengthen the administrative, financial and legal foundations of IUFRO for the benefit of its members

GOAL 2: To expand strategic partnerships and cooperation

2.1 To enhance interdisciplinary cooperation within the scientific community

2.2 To expand partnerships and collaboration of IUFRO with international organizations, governments and stakeholders

2.3 To strengthen cooperation within and between regions

GOAL 3: To strengthen communication and links within the scientific community and with students as well as with policy makers and society at large

3.1 To enhance communication within the scientific community and increase interest and involvement of students in forest science

3.2 To strengthen links between science and policy and provide scientific information and advice for international policy-making

3.3 To increase public awareness about forest science.

Part I was called to be a communication tool, and Part II was intended to serve as an operational programme, e.g., for the implementation of the Strategy consisting, of 30 actions, as well as the points of evaluation.

Excursions

The Congress offered very interesting excursions to southeast Queensland. On Thursday, August 11, 2005, about 1,400 participants and accompanying persons went to various forestry-related sites on 34 separate thematic routes, with their themes including pine and other tree species plantations, forest conservation and recreation areas, research and industry sites. Participants could visit clonal pine plantations and plantation nursery at Beerburrum; Indigenous People at Boondall Wetlands; spot wildlife; visit the Pumicestone Passage by a ferry trip; Mt. Coottha and gardens around it, Mary Cairncross Park; Kennedy's Timbers to see recycling of timber products; natural forests in and around Brisbane and many other places.

The post-Congress tours were organized in a way to demonstrate results of research and different aspects of forest management, interesting technical and tourist attractions in various Australian regions. Altogether 10 routes for 6-7 days each were offered, and after pre-registration, routes 3, 4 and 8 were dropped due to low interest. Only 126 people participated in four previously announced and one additionally organized (*Land of Contrasts*) excursions. Description of the excursions is based on the Congress Report (IUFRO 2005b, pp.107-108):

Route 1. Tropical North Queensland. (Leader: Mr Errol Wiles; Local organiser: Mr Geoff Dickenson, Queensland Department of Primary Industries), 7 days, 45 participants. This route went through the most diverse and beautiful parts of Australia, showed aboriginal culture, the Skyrail rainforest cableway, Daintree National Park and the beautiful Atherton Tablelands. Technical aspects included coastal and upland rainforest research, conservation and rehabilitation, management of native conifer, exotic conifer, eucalypt and mixed rainforest plantations and Tolga Woodworks - a locally owned business producing high-quality furniture and craft products from Australian native forests.

Route 2. Papua New Guinea (cancelled)

Route 5. Southern New South Wales/Australian Capital Territory (cancelled)

Route 6. Tasmania. (Leader: Mr Ken Felton, retired forester; Local organiser: Mr John Hickey, Forestry Tasmania), 6 days, 17 Participants from 11 countries. The tour began in Hobart, the most populous Tsmanian city at the southern tip of the island, and ended in Launceston in the north. The participants visited the Air Walk Tahune Forest with its tallest hardwood trees in the world; they could see regrowth eucalypt forests and the Warra Long Term Ecological Research site; visit the historical penal settlement at Port Arthur and the spectacular Freycinet National Park, climb the Cradle Mountain in the National Park, a World Heritage Area and see Cataract Gorge in the heart of Launceston. The group visited a plantation, a native forest management site and processing facilities.

Route 7. Victorian West Coast and Green Triangle South Australia (cancelled)

Route 9. New Zealand. (Leader: Mr. Jeff Tombleson; Local organizer: Dr. Mike Menzies), 7 day, 33 participants. The tour provided the group with an overview of both indigenous and exotic forests, including the central North Island. Participants visited the Pureora Forest, a magnificent indigenous forest, dominated with one thousand-year-old podocarp trees, Kaingaroa Forest, New Zealand's largest radiata pine plantation (170,000 ha), and Tarawera and Kinleith Forests where they saw exotic forestry operations. Other places were Gill & Geoff Brann's award-winning agroforestry property, Kinleith pulp mill, and SCION (Forest Research facilities) where their CEO, Dr. Tom Richardso, made an overview. Social and cultural events included a lunch at a local winery, a visit to the Waitomo caves, and tourist activities around Rotorua. A highlight was the Te Puia geothermal geysers, boiling mud pools and steam vents and a traditional Maori hangi dinner and concert.

Route 10. New Caledonia. (Leader: Agence Arc-en-Ciel; Local organiser: Jaques Tassin, Thierry Menneson, IAC), 7 days, 9 participants. During this tour, its participants got information about ecological studies, visited dry forest restoration sites, areas with native fauna and deer damage areas, they saw soil conservation activities, limonite waste dumps, preservation of sites of high biodiversity, rehabilitation of "maquis" vegetation on mining sites and visited the Pine Island.

Route 11. Land of Contrasts. This route was not planned beforehand. But it attracted 22 participants. The excursion was not professional; it was rather a sightseeing and informative tour and included visits to the Great Barrier Reef, the famous rock monolith Uluru, and attractions of Sydney.

Russian participation

From Russia, only seven people were registered at the Congress, mostly from the Moscow State Forest University. The group was led by Rector Victor G. Sanaev (Moscow State Forest University) and included Olga V. Makarova, Valentin S. Shalaev and Natalia A. Vinokurova (all from Moscow State Forest University) and Yuri E. Mikhailov (Ural State Forest Technical University), Olga V. Sidorova (Sukachev Institute of Forest, Siberian Branch, RAS) and Victor K. Teplyakov, Professor, Moscow State Forest University (IUCN). In addition, Maxim A. Lobovikov attended the Congress as a representative of the International Network for Bamboo & Rattan (INBAR), Beijing, China. On the other hand, Dr. Ho Sang Kang from the Republic of Korea was registered as a member of the Russian delegation as at that time, he took his Postdoctoral Programme at Moscow State Forest University.

Papers and posters from Russia were submitted by scientists from the Sukachev Institute of Forest, Siberian Branch, RAS, the Ural State Forestry University, and frim several other Russian research organizations. Professors and research workers from the Moscow State Forest University submitted 6 papers, with two of them presented at Sub-Plenary Sessions. The contributions of Russian participants are listed below in the alphabetical order by the name of the Russian author or co-author:

1. Vlosky, R.P., Pepke, E., Akim, E.L., Becker, M., Buckley, M., Cohen, D.H., Hansen, E., Kärnä, J., Ozanne, L.K. IUFRO and UNECE/FAO take a leadership role in international forest products marketing;
2. Antonova,G.F., Chapligina, I.A. Cell wall polysaccharides during early-wood and late-wood formation in *Larix sibirica* Ldb;
3. Fedotov, G.N., Shalaev, V.S., Pakhomov, E.I., Zhukov, D.V. The influence of an organic-mineral gel on the soil properties;

4. Kurz, W.A., Gytarsky, M.L., Matsumoto, M., Richards, G., Schlamadinger, B., Ståhl, G. National forest carbon accounting systems: A synthesis of national solutions to a global challenge;
5. Gytarsky, M.L., Filipchuk A.N., Moiseev B.N., Karaban, R.T., Malysheva, N.V., Nazarov, I.M. National Greenhouse Gas Inventory and Reporting System for the Forest Sector of Russian Federation;
6. Komarova, T.A., Sibirina, L.A., Lee, D.K., Kang, H.S. Natural regeneration on burnt areas of coniferous-broadleaved mixed forests in southern Sikhote-Aline Mountain Range of Primorsky Kari, Russia;
7. Konovalova, N.T., Konovalov, N.T., Bazhenov, A.N., Parshov, S.M., Stasova, V.V., Antonova, G.F. The effects of supersonic treatment on the structure and components of oak wood;
8. Kudinov, A.I., Orekhova, T.P., Zhabyko, E.V., Man'ko, Y.I., Lee, D.K., Kang, H.-S., Nyam-Osor, B. Long-term stand dynamics at the old-growth Korean pine-broadleaved forests of Ussuriisky Zapovednik in southern Primorsky Krai, Russia;
9. Makarova, O.V., Bondarenko, V.V., Koolen, A.J., Shalaev, V.S. Relationships between dust-like soil structure and urban forestry and city management in Moscow;
10. Makarova, O.V., Bondarenko, V.V., Koolen, A.J., Shalaev, V.S. Relationships between dust-like soil structure, urban forestry and city management in Moscow;
11. Man'ko, Y.I., Gladkova, G.A., Butovets, G.N., Lee, D.K., Kang, H.S. Survival and growth of spruce and fir in advance regeneration after harvest cut in Primorsky Kray, Russian Far East;
12. La Porta, N., Muccinelli, I., Passerotti, S., Melnikova, M. Assessing the genetic variability of commercial seeds in Europe: An example in Norway Spruce;
13. Mochalov, S., Moiseev, P., Zoteeva, E., Mikhailov, Y., Fedorenko, S., Vorobyova, M., Zyusko, A., Lässig, R., Hoffmann, C. Consequences of large-scale wind-throw on the regeneration and biodiversity of boreal forests in the Central Urals;
14. Mukhortova, L.V. The effect of young forest ecosystems on the soil carbon Balance in southern taiga of Central Siberia;
15. Sizykh, A. The forest ecosystems of the taiga and steppe contact zone (Lake Baikal's western shore);
16. Sanaev, V.G. Russian higher education in the global education area;
17. Sidorova, O.V., Vaganov, E.A., Naurzbaev, M.M. High resolution records of temperature change during the last millennia in high latitudes of Siberia, Russia;
18. Teplyakov, V.K. Forest Tenure and Management in Boreal Zone Forests. Key Issues and Implications for Sustainable Management and Conservation;
19. Teplyakov, V.K. The boreal forests: Fragmented, fragile and fabulous. Key issues and implications for sustainable management and conservation;
20. Teplyakov, V.K. Forest management in partnership with civil society: A Russian case;
21. Vinokurova, N. Analysis of national cultural background of Russian labour and management cultures in the forest industry.

In particular, at the Plenary session: *Sustaining Forests: A Duty for Forestry and Society?*, "Victor Teplyakov showed by the example of Russia whether and how forest management in partnership with civil society is possible in transition countries. The need for inputs from society is very high to support environmental and social tasks of forests. Nevertheless, the process of participation takes time and the mutual learning of representatives of the state and of the civil society has not yet developed much. Although the democratic traditions in Russia are not strongly

developed, the forest sector is trying to incorporate public opinion into decision making[287]" (IUFRO 2005b, c. 67).

Interesting facts

It is noteworthy that the Global Forest Information Service (GFIS) Project (www.gfis.net), implemented since 1998, was presented for the first time at the exhibition hall of the IUFRO Word Congress in Brisbane. The GFIS as a new search engine includes key information resources (news, events, publications, jobs, etc.). The goal of GFIS is to provide all forest stakeholders with equal opportunities for sharing and receiving information of mutual interest. The GFIS mission is to disseminate information and knowledge in the global forest community to contribute to the development of common approaches and standards, and the partnership network alignment. GFIS participants are public, non-governmental and private organizations around the world, including those in developed and developing countries.

Following the tradition, Australia released a series of stamps on the occasion of the 22nd IUFRO World Congress. The stamps depicted trees from different habitats of Australia, including two species of eucalyptus – Snow Gum (*Eucalyptus pauciflora*) and karri (*E. diversicolor*), wollemi pine (*Wollemia nobilis*), boab (*Adansonian gregorii*), and Australian banyan or Moreton Bay Fig (*Ficus macrophylla*). Collectors could purchase these philatelic items with a special sign of the first-day cover at the Exhibition Hall.

Another tradition is the Congress Exhibition, which brings together the latest achievements in forest science, practice, education, techniques, etc., displayed in the booths of different national and international non-governmental, academic, industrial, public, and other forest organizations and institutions, as well as UN agencies (FAO, UNEP, UNDP).

The numerous interesting things included the exclusive interview of Moriz Vohrer from Germany, Commissioner and Member of the International Forestry Students' Association (IFSA), for the *Congress News* on Tuesday, August 9, 2005. The IFSA participated in the Congress for the first time and made a good job, according to the Congress organizers. From another point of view, Moriz Vohrer expressed the younger generation's point of view, saying: "If students from the Association ask me about who the 'big shots' of forestry are, I can now tell them, and provide information on who does what and where it happens. This is very exciting and a great opportunity for the Association. The Congress has been very well organised, and I know a lot of people are very astonished about how great it is, and how many people there are here!" [288]

[287] The Forest Code of the Russian Federation, adopted in 2006, contains a provision (Article 1, paragraph 7) for "participation of citizens and civil society associations in decision-making which may affect forests when they are used, protected and renewed, with procedures for and forms of such participation to be compliant with the legislation of the Russian Federation" (Forest Code 2006).

[288] The Interview. Face the future. XXII IUFRO World Congress 2005. Congress News. Brisbane Convention & Exhibition Centre, Queensland, Australia. Tuesday 9 August 2005.

Chapter 29
Congress XXIII – August 23-28, 2010, Seoul, Republic of Korea

The main sources of information for this section are the Report on the work of the 23rd IUFRO World Congress in the Republic of Korea, published in Seoul by the Korea Forest Research Institute (IUFRO 2010a), President's Office Report (IUFRO 2010b), commemorative album (IUFRO 2010c), Congress Abstracts (IUFRO 2010d), and personal archives and memoirs of the authors of this book who participated in the Congress.

Overview

The 23rd IUFRO World Congress was held under the title: *Forests for the Future: Sustaining Society and the Environment.* It was attended by 2,734 participants from 92 countries - the largest number of participants in the history of the IUFRO Congresses. The largest delegations were from the Republic of Korea (878 people), Japan (272), China (214), USA (164), Indonesia (99 people), with 20 countries having only one delegate each. It was reported that 20 people were from Russia.

The Congress Agenda included 170 scientific sessions at various levels where a record number of 916 papers and 1,054 posters were presented. Thematic excursions offered 18 routes before and after the Congress, including tours to other countries: China, Mongolia, and Japan. IUFRO together with the IFSA organized a ten-day tour around the country for forestry students.

There were many pre-Congress and parallel meetings in addition to the main program. More than 40 conferences, symposia, side-events, and various discussions were organized. The largest number of them were prepared and held by representatives of the Republic of Korea. For Russian participants, the following events were of interest:

- Global forests: the role in integrated land management, organized by the International Institute for Applied Systems Analysis (IIASA);
- Preparation of the State of the World's Forest Genetic Resources report, organized by FAO;
- Forestry researches for global environment, organized by Forestry and Forest Products Research Institute, Japan;
- Interactive arena for researchers and decision makers with an interest in forest futures, organized by Swedish University of Agricultural Sciences (SLU);
- A meeting of the International Boreal Forest Research Association (IBFRA), organized by the USDA Forest Service.

Two events were also organized by the International Forestry Students' Association (IFSA).

One of such activities (the Workshop on Enhancing Partnership for Forest Education and Research in Asia) was attended by representatives of the Moscow State Forest University: Rector V.G. Sanaev and Professors V.S. Shalaev and V.V. Nikitin. The meeting was moderated by Professor V.K. Teplyakov from Seoul National University who had graduated from the Moscow Forestry University. The keynote speaker was Vice-Chancellor of the Swedish University of Agricultural Sciences (SLU) Professor Lisa Sennerby Forsse whose presentation was called: *Forestry education in the European context - the example of Sweden*. Professor Sanaev presented a paper about forestry education in Russian forest universities.

Owing to the financial assistance of the Scientist Assistance Program (SAP), 174 forest scientists from 55 developing countries could attend the Congress, and the Seoul National University (SNU) financially supported other 78 participants, which increased the number of participants from developing countries to 252. The four Pre-Congress Training Workshops on forests and climate change, forest-water interactions, traditional forest knowledge and, forests and human health were held and attended by 69 invited forestry scientists from 28 countries.

On August 22, 2010, about 200 delegates participated in the Tree Planting Ceremony in the Seoul Forest – a new urban park in Seoul – to create a IUFRO Garden. A seven years old offspring of a Jeongipum pine tree (보은 속리 정이품송)[289] and seven descendant trees of a nine-years old Geumgang pine (*Pinus densiflora* for. *erecta*) were planted and a landmark sign was unveiled nearby.

Scientific program

On August 23, 2010, the 23rd IUFRO World Congress began its work with a small performance and a demonstration of a short movie about the on-going work in the Republic of Korea to promote "green growth".

At the Opening Ceremony, Jan McAlpine, Executive Secretary of United Nations Forum on Forests (UNFF) delivered a congratulatory message to the Congress on behalf of UN Secretary-General Ban Ki-moon. Dr. Eduardo Rojas-Briales, Assistant Director General of the Food and Agriculture Organization (FAO), presented his welcome address.

[Opening Ceremony, August 23, 2010, Seoul, Republic of Korea.
Source: IUFRO Congess Organizing Committee.]

[289] Jeongipum pine is the only Korean pine, designated as the Korean Natural Monument (No. 103).

It was the first time in the history of the IUFRO Congresses that the Head of the State attended the Opening Ceremony and welcomed the audience. President of the Republic of Korea Lee Myung-bak emphasized the importance of forests "as the origin of life and blood of people". He described the *Green Growth* initiative of the Korean Government as a national visualization of balanced country development and nature conservation. Then, he introduced the concept of carbon offset to reduce GHG emissions. President Lee also gave a brief account of current policies, related to Korea's vision of international forestry development via establishment of the Asia Forest Cooperative Organization (AFoCO) as a support tool and link between the Republic of Korea and ASEAN region, and the Global Green Growth Institute "to strengthen international cooperation for green growth" (IUFRO 2010a p.9).

The scientific program was divided into 5 plenary sessions, 15 sub-plenary sessions (3 sessions every day, with altogether 61 papers presented) and 150 technical sessions. In addition, there were three general poster sessions with a total of 1,146 presentations.

One-hour plenary sessions for keynote presentations were held every morning (except for Thursday which was reserved for the in-Congress tours) and attended by more than 1,300 delegates on the average for each session.

On August 23, 2010, at the Opening Ceremony, the following 11 prominent forest scientists received the IUFRO Scientific Achievement Award (SAA):

- Janaki Alavalapati (USA, Virginia Tech) – for his research on exploring market solutions to promote sustainable use and management of forests and environment at local, national, and international levels;
- Michael Battaglia (Australia, SCIRO) – for his contributions in building fundamental knowledge about the physiology of *Eucalyptus*, a predominant genus in plantation forestry in temperate, sub-tropical and tropical environments; developing innovative and versatile process-based models serving as research engines for Australian forest science, linking disciplines of eco-physiology, soil science, hydrology, pathology, wood science, remote sensing and spatial sciences in ways not possible before; leading the applications of models to complex contemporary forest management issues at the landscape, regional and continental scale, and setting the framework for enhancing the opportunities, preparedness and response strategies of the Australian forestry sector arising from climate change;
- Yousry A. El-Kassaby (Canada, University of British Columbia). His research strove to maximize the efficiency of tree improvement programs through the creation of effective, seamless and integrated tree improvement delivery systems. His ongoing projects included: (i) understanding pollination dynamics in tree improvement production populations (seed orchards) and their role in capturing and maximizing genetic gain and diversity; (ii) development of efficient advanced generation seed orchard designs capable of coping with the increased complexity caused by co-ancestry build-up; (iii) increasing the utilization efficiency of genetically improved seed through understanding seed germination biology and ecology; (iv) development of accurate and efficient *in situ* wood quality assessment methods for tree breeding and utilization programs; and (v) applying Artificial Neural Networks (ANNs) to seed orchard management and wood quality assessment;
- Tonni Agustiono Kurniawan (Finland, University of Eastern Finland). His international reputation as a prominent early-career researcher in the field of environmental chemistry was recognized by peers through exceptional citation counts of his first SCI publication including well known "Low cost adsorbents for heavy metals uptake from contaminated water: a review" (2003) and his outstanding achievements in the environmental field reflected in various peer-reviewed SCI journals with high impact factor, conference proceedings, and book chapters;

- Sun-Young Lee (Republic of Korea, Korea Forest Research Institute) – for his amalgamation of forest products technology with nanotechnology. His research emphases included wood plastic composites, nanocomposite materials, nanocellulose, nanopapers, and secondary ion battery separator. From the results of his research in wood plastic composites he provided considerable technical support and advice to industry. He also developed multifunctional bio-composites for engineering performance and durability, using low cost natural resources and efficient manufacturing parameters. He was successful in manufacturing nanocellulose fibres and nanocellulose whiskers using mechanical and chemical treatments and etc.;
- Andrew M. Liebhold (USA, USDA Forest Service), who conducted and published outstanding research on forest insect pests for more than 20 years. He was unquestionably amongst the best-known and most highly respected forest entomologists in the world. His research focused on invasive forest insects, considering concepts relating to their spread and to developing a holistic understanding of forest insect and disease invasion biology. He was acknowledged as a pioneer in recognizing the importance of forest insect and disease invasions and a global advocate on this important topic;
- Shawn Mansfield (Canada, University of British Columbia) – for his research on understanding the innate differences in fibre composition and morphological characteristics existing in tree lines within species, and elucidating what impact these phenotypic traits had on wood processing and product quality;
- Nor Azah Mohamad Ali (Malaysia, Forest Research Institute Malaysia – FRIM) for her research in natural product and analytical chemistry related to forestry, agriculture and herbal industries. Some of her research work were taken up and commercialized by the herbal industries. she was directly involved in agarwood (gaharu) research, focused on the chemical characterization, fingerprint profiling, sensory pattern evaluation of agarwood oils and artificial inducement of agarwood;
- Jerome Vanclay (Australia, Southern Cross University) – for his wide and profound contributions to forest modelling, from mensuration to biodiversity, and from the social to the political arena. Much of his research was visionary and affected the management of forests in many countries;
- Jiaojun Zhu (China, Institute of Applied Ecology Chinese Academy of Sciences) – for his significant research contributions dealing both with the theories and practical techniques for the management of shelter forests. His main research findings were dealing with the protective maturity, methods for structure determination and decline mechanisms of shelter forests;
- Janusz Zwiazek (Canada, University of Alberta) received his training in Poland and Canada and since completing his Ph.D. degree, was focused on research on stress physiology of forest plant species. His research addressed some of the most important fundamental and applied questions that faced the tree physiology scientific community and forestry industry. His research answered questions such as: what were the sensitivities and thus their tolerance of forest plant species to abiotic stresses such as drought, soil compaction, salinity and pollution; how to use knowledge gained in tree physiology research to improve planting survival and growth performance of tree species; what were the mechanisms of drought resistance in fast growing hybrid poplar trees; and how to use ectomycorrhizas to improve tree performance under stressful conditions and thus the success of reforestation programs.

During the Opening Ceremony, the famous Korean poet and Nobel Prize nominee Ko Un impressively performed an “orison” about woods in his talk: *An Act of Grace from the Forest: How is Absolution Possible?* He said: “I skip the old Korean custom of giving a long greeting of delight.

The title of this speech was initially 'Crime and Punishment', a rather ungraceful, if not ungrateful, title for the occasion. It would also have been a conspicuous reminder of Dostoevsky. The title that emerged as an alternative was just as flawed. When one recalls the selling and buying of indulgences in the Catholic Church in late medieval times, one wonders about the respectability of such profane practice. In the end, I used the second title as the subheading for a new one. As long as the subject is the forest, our reality today is that human civilization cannot ignore my lament. The story of the forest today must not be a story but a cry." (IUFRO 2010a, p. 61).

The major idea of his presentation was built around the saying "Forests precede civilizations, deserts follow them". He said: "The forest is the future for all of us. By declaring that 'the forest is the future', I am not suggesting that we return to the age of the prehistoric forest. But I am certain that human life will no longer be sustainable if we continue to exclude the forest from our daily lives and continue as a civilization that knocks down forests. (…) My thesis is that the crime can no longer remain buried, punishment can no longer be evaded, and absolution is too shameless; this thesis is a subset of the larger thesis that the grace of the forest still endows us with blessings to the extent that we serve the forest. Nature is still the main body of all life forces and leads to the healing of all pollution and sacrilege. Humanity today must return at least part of itself to nature. The nations of tomorrow will succeed as nations only if they are nations of the forest. I hope that today's meeting is the meeting of forests" (ibid., p.65). In this regard, "the forest is a means of overcoming the fears of survival caused by God and maintaining human being's life today. Now I would like to look ahead of our future that covers the spirit, reality and fate of the forests in the far future facing us" (IUFRO 2010a, p.16). He concluded: "The servant of the forest is indeed a saint" (ibid., p.61).

On August 24, the keynote presentation of Dr. Frances Seymour, Director General, CIFOR, was called *Forests, Climate Change, and Communities: Making Progress up the Learning Curve* and highlighted lessons learned by the forest research community from numerous problems. The speaker said: "We've learned just how important forests are as a source of livelihoods for rural communities: Local people in East Kalimantan identify more than 2000 different forest species with more than 3600 different uses, 119 of which have no known substitute. Rural population in the Congo Basin derive as much as 80 percent of the protein and fat in their diets from bushmeat" (IUFRO 2010a, p.66). She also concentrated on the idea of Reducing Emission from Deforestation and Forest Degradation, and fostering conservation, sustainable management of forests, and enhancement of forest carbon stocks (REDD+), which became a critical element of the emerging global climate protection regime. She said: "Research on forest tenure, community forestry, integrated conservation and development, and forest law enforcement all suggest lessons for REDD+ and forest related adaptation interventions. (…) Unless such initiatives are able to shape rather than be shaped by, the political economy of forests at global, national and local levels as well as the opportunity to improve the lot of forest communities will be lost" (ibid., p.16-17).

On August 25, 2010, Director General of CATIE José Joaquín Campos Arce presented his keynote address: *Integrating Scales and Sectors to Foster Sustainable Livelihoods, Landscapes and Forests*. He presented a case for radical changes in views on global environmental issues by stressing the need for a systematic approach to address the complex challenges facing the international community, via interdisciplinary platforms, mechanisms and intensive coordination of the efforts.

According to Dr. Campos, agroforestry systems were key to improving rural life especially of poor families. He identified a few components of such systems: control the density and growth of crops to increase carbon stocks without reducing crop yields; link local communities with socially responsible companies; search for innovative approaches to reduce production costs; identify ecosystem approaches for sustainable forest management, forest conservation and the creation of bio-corridors. He stressed the importance of forest education and training of new forestry specialists,

interdependence of social and environmental resilience and their key role in ensuring the sustainability of life, landscapes and forests. He made the following conclusions: "1) Social and ecological resilience are interdependent and are key for sustainable livelihoods, landscapes and forests. 2) Reductionist approaches in forest R&D have limited our contribution to sustainable development. 3) System approaches are necessary for addressing complexity and achieving sustainable development. 4) But they come at price: require inter-disciplinarity, multi-stakeholder platforms/mechanisms, intense coordination and negotiation, thus, increased transaction costs. 5) Implementing these approaches also requires: collaborative and participatory research; committed and capable leadership, and long-term commitment from policy-makers, donors, development practitioners and researchers. 6) To achieve sustainable livelihoods, landscapes and forests, there is no alternative to system approaches." (IUFRO 2010a, p. 77).

On August 27, 2010, the 2009 Nobel Prize Laureate in Economics, Professor of Political Sciences Elinor Ostrom (Indiana University-Bloomington, USA) delivered her keynote presentation entitled: *The Potential Role of Communities in Sustainable Forest Resources*. She stressed that many factors sustaining forest resources belonged to communities, and in such an instance, a simple management model was neither useful nor satisfactory because multiple factors were influencing forest conditions. Professor Ostrom underlined that studying socioecological interactions required both understanding of dynamic processes and adaptive policies, and thus, avoiding the "paper park", a static solution, as a panacea for conservation. Then she reviewed a number of case studies in Bolivia, Colombia, Guatemala, India, Kenya, Mexico, Nepal, Tanzania, Thailand, Uganda, and the USA with over 200 sites taken into consideration. The idea was to address such issues as "How alternative systems of governance and tenure affect social and ecological conditions? What conditions favour collective action for the provision of resource management? How do people respond to changing ecological and social conditions? How do diverse actors – user groups, local associations, governments, interact and jointly affect forest conditions?" (IUFRO 2010a, p.79).

Under those case studies, she identified three indicators central to the research: richness and density of tree; behaviour of forest user; and illegal activity in forests. She specified that owing to these indicators, first, when comparing official parks to non-parks, ownership made no statistical difference to vegetative density; second, forests lacking effective law enforcement were more susceptible to degradation and those with effective enforcement mechanisms, including user monitoring, had a higher probability of regeneration; and third, conservation potential was highly dependent upon an effective combination of official and local user involvement. She highlighted that privately owned forests had significantly less illegal activity when local users were permitted access to forest products, as did government forests where indigenous communities provided monitoring services. She said that enabling communication between forest users and authoritative agencies enhanced cooperation and conservation results even if sanctions were involved. However, she added that conservation was the highest when local users could choose their own sanctioning methods (IUFRO 2010a, 301).

In conclusion, Professor Ostrom underlined the viability of multi-disciplinarity and importance of careful designs, proper training and consistency. As major conclusions, she pointed out that it was feasible to combine disciplines and research methods to study communities in complex SESs, but it was challenging. She added: "We address many of the challenges. Findings from one method help explain the findings from other methods". The speaker also stressed that no Panaceas existed because most important policy-relevant finding was reinforced in multiple studies; and that presumption that there were top down solutions to complex problems of sustaining SESs over time was wrong. She indicated to the need nested polycentric institutions that fitted particular

attributes of a resource as well as of the users, saying that users needed to be included as real participants in the crafting of governance to make these systems work well over time" (ibid., p.83).

On August 28, 2010, the keynote speech of Peter Shaw Ashton (Great Britain), Emeritus Professor at the Harvard University, USA, drew attention to the plight of tropical forests, starting with its meaningful title: *The Disastrous Trajectory of the Rain Forests: Research Imperatives*. On the example of his extensive experience in Southeast Asia, he noted the continuous loss of evergreen forests, and those old-growth forests which remained only on steep slopes and in areas with limited access or poor agricultural potential. He said: "The colonization of the Asian tropics by western powers brought with a serious attempt at sustainable management, but focused more or less exclusively for timber, and industry rather than communities and the products and services that are important for them" (IUFRO 2010a, p.84). The speaker pointed out that temperate forests had underwent a similar transformation at one time and recovered, but tropical forests were unlikely to resurface. He also said that in modern world, temperate forests were under threat from pest and pathogens, which were introduced and could increase their expansion as global travel increased. Professor Ashton suggested: "There are two solutions: Conservation of the gene sequences which imbue wild crop relatives with resistance, that they may be available for genetic engineers; or a revolution in tree crop design, based on what is being learned by research in surviving rain forests. It is not too late to conserve, and the costs are not prohibitive" (IUFRO 2010a, p.18). The major questions were, as usual, "who will benefit?" and "who will be willing to pay?" as his calculations showed that the compensation for 5,000 hectares of strict forest biodiversity reserves could be $75 million per year, for Asia alone (ibid., p.87). The solutions required vision, goodwill and solidarity within policymakers' community, but it was not yet evident.

The Congress Scientific Committee (CSC) built the program format and contents, reflecting the concept of the Congress's title: *Forests for the Future: Sustaining Society and the Environment*.

First of all, it should be noted that the themes of the sub-plenary sessions were to some extent reflecting the scientific focus of the program. They included:

- Reading the pulse of forest science – IUFRO Priorities 2010~2014;
- Can forestry and forest sector activities contribute to mitigating climate change?;
- Conservation and sustainable use of forest genetic resources;
- Forest biodiversity – the key to healthy and resilient forests;
- Biodiversity, climate change and forestry – Perspectives of the CPF;
- New frontiers of forest economics;
- Agroforestry: the way forward;
- Keep Asia Green: rehabilitating and restoring forest ecosystems in Asia;
- Enhancement of service life of wood in an environmentally conscious global society;
- IUFRO Director's Forum: forest monitoring in times of climate change;
- Forest biomass utilization for bio-energy: technology, economics, and environment;
- Forest health in a changing environment;
- Promoting urban forest services in partnership between scientists and communities;
- An honest conversation about decentralization and forest livelihoods in a globalized world;
- IUFRO award winners – the next generation.

There was a presentation from Russian participants at sub-plenary session SP-08 (Keep Asia Green: rehabilitating and restoring forest ecosystems in Asia) where "Victor Teplyakov, Seoul National University, discussed forestry issues in the Russian Federation's Far East region. Systematic forest management over more than hundred years has shaped the landscape including significant efforts on reforestation" (IUFRO 2010a, p.92).

Major discussions in the Divisions and other research units were around nine themes identified by the CSC: Forests and Climate Change; Biodiversity Conservation and Sustainable Use of Forest Resources; Forest Environmental Services; Asia's Forests for the Future; Forest Products and Production Processes for a Greener Future; Emerging Technologies in the Forest Sector; Frontiers in Forest and Tree Health; Forests, Communities and Cultures; and Forests, Human Health and Environmental Security. It should be noted that the scientific orientation of the program, papers and posters was ultimately reflected in the Congress Resolution and IUFRO Strategy for 2010-2014 (IUFRO Strategy 2010).

At the Congress, the traditional President's Discussion was very interesting. On August 23, 2010, IUFRO President Don Koo Lee invited distinguished people, representing the forest research community, students, business, NGOs, and international organizations to discuss Future Challenges for Forest Education to make forest education more effective and attractive in the future.

Professor Don Koo Lee chaired the Panel Discussion, and Dr. Peter Mayer moderated it. The key speakers were Hosny El-Lakany (Adjunct Professor, University of British Columbia), Professor Yoon Soo Kim (President, Chonnam National University), Emmanuel Ze Meka (Executive Director, International Tropical Timber Organization), Florent Kaiser (President, International Forestry Students' Association - IFSA), Hideki Nose (Director, Sumitomo Forestry Co. Ltd., Japan), and Gerald Steindlegger (Policy Director Forest & Carbon, WWF International).

Professor Don Koo Lee welcomed the participants and stated that forest education was key to creating a rigorous basis for forestry and timber sectors in the future. Bearing this in mind, it was also necessary to take into account challenges faced by society, national and international economics and political framework conditions. He further pointed to two main objectives of the Panel to discuss future challenges and identify basics for attractive and effective forest education, and to discuss IUFRO's role and concrete activities to address these issues in the IUFRO framework.

Professor Hosny El-Lakany in his capacity of the Chair of the International Partnership for Forestry Education (IPFE), presented his Vision for Forest Education 2015. With concern, he noted the decreasing admission in forestry departments and colleges. He attributed that alarming situation to incorrect perceptions of professional requirements among forestry teachers, and resultant risks that forestry students and then graduates would lose touch with the forest. Then, the speaker stressed that modern forest management required interdisciplinary methodologies based on concrete science but balanced with economic, environmental and social demands. If the universities wanted to find their place in the future educational market, they had to undergo fundamental changes. To that end, he identified the following "six steps for change: (1) Restructure the curricula, beginning with graduate programs and proceeding to undergraduate programs; (2) Consider abolishing permanent departments and create problem-focused, multidisciplinary programs; (3) Increase collabora-tion among institutions, nationally and internationally, and emphasize international aspects of forestry; (4) Transform current dissertation systems so that students do not write original papers but develop analytic treatments in e-formats; (5) Expand the range of professional options for graduates and prepare students for jobs that may be different from which they are being trained for; and (6) Re-visit the current tenure system and replace it with time-bound contracts for educators which can be terminated or renewed" (IUFRO 2010a, pp.22-23).

Professor H. El-Lakany concluded his speech with information about the International Partnership for Forestry Education which was a non-profit, voluntary partnership aiming at addressing challenges and opportunities facing university-level forestry education globally.

In his presentation (Should foresters be educated at universities or at technical colleges?), Professor Yoon Soo Kim remarked that since the 1970s there was a general shift in the students' interests from the liberal arts towards "practical arts", e.g., applied knowledge and relevant skills.

The students had become more intellectual consumers not only in the "supermarket of information" but also in picking the majors, because in many developed countries, a four-year university forest education did not guarantee better jobs and higher income. It was mainly because such 4-year education usually combined teaching and research with goals to make leaders in various fields of forest sciences. In contrast, 3-year technical college education focused rather on instruction for jobs in the forest sector and stressed the education on definite disciplines and related main fields of practice. The speaker further noted a significant decline in the number of university-level graduates in forestry worldwide. Although a slight increase in graduates could be observed in Asia, this increase did not compensate for the massive decline globally. He stated that this decline reflected a failure to adequately respond to rapidly changing social, economic and political environments, which had resulted in a decrease in job opportunities at the professional level and an over-production of graduate students in OECD countries. Therefore, there was a need to assess strengths, weaknesses, opportunities and threats in forest education in the universities in comparison with other disciplines. Kim also suggested increasing the collaboration of universities in OECD countries with tropical countries, as well as strengthening technical education in countries with rain forests (ibid., p.23).

Emmanuel Ze Meka in his presentation (International forest-related agreements – What students should learn*)* gave an overview of international forest-related legislation. He pointed out that forest international cooperation was motivated by (a) rising worry about deforestation and forest degradation in the 1960s, (b) increasing decline of the human environment and natural resources, and (c) their consequences for economic and social development in many countries. He said that there were over 40 ongoing forest-related international and regional agreements. Only two of them (namely, the UNFF and the International Tropical Timber Agreement/ITTA) were dealing exclusively with forests. Numerous other agreements only mentioned forests as an element of environmental protection and nature conservation. The speaker stressed that increasing fragmentation and lack of coordination among forest-related international agreements limited their effectiveness and efficiency in tackling global forest problems. Although significant progress had been made in various fields, notably in operationalizing sustainable forest management through criteria and indicators and forest certification, the world's total forest area continued to decline, biodiversity continued to be lost at an unprecedented rate, and there continued to be rampant illegal harvesting and trade" (ibid., p.23). In this regard, he emphasized the role of forestry education in raising environmental awareness of the need to improve international cooperation and to concentrate efforts to resolve problems of the world's forests.

In his presentation (What students would like to learn about forests?), IFSA President Florent Kaiser noted that by entering higher education, students often went into a development process to become a "professional" and match the "real world", but the reality deferred from the students' earlier expectations. However, what a student actually had to understand was not how to adapt to the professional world, but how to implement the original vision into life and work. To achieve this, students had to go out in the forests and get practical experience, keeping in mind what they had learned at classes. Thus, they should get more chances to evaluate the applicability of knowledge received in classes by having more short-term and long-term projects in university curricula. It was also essential to promote exchange among students, teaching institutions and teaching methods bearing in mind global change and differences of forest conditions around the world. He also mentioned that non-formal learning methods and gaining of soft skills such as communication, organization, and leadership were of great importance. In conclusion, he stated that IFSA paid much attention to up-to-date challenges of forest education and to turning students' visions into reality.

Speaking in behalf of the business community, Hideki Nose, Director, Sumitomo Forestry Co. Ltd., Japan in his presentation "What business and industry expects from forest education"

talked about his company the Sumitomo Forestry Co. Ltd., and its activities to accumulate expertise for forest management as well as requirements for forest education. He pointed to a trend towards specialized knowledge and some shortages in forest graduates' judgements on broader forest issues, related, *inter alia*, to biological diversity and economics. He also emphasized the importance of humanistic attitude, environmental responsibility and life-long learning for achieving sustainable society and the importance of field experience, noting that the utilization of advanced technology was of key relevance for achieving comprehensive and sustainable forest management. Director Nose concluded his statement with an old Japanese proverb to the effect that 'only by looking at a tree, you cannot know the forest'." (IUFRO 2010a, p.24).

Gerald Steindlegger, Policy Director Forest & Carbon, WWF International, called his presentation: Needs for forest education – An environmental NGO perspective. He underlined that in order to keep its significance, modern forest education had to be oriented towards maintenance and enhancement of various forest values, such as carbon, water, biodiversity and recreation, as well as to demonstrate that it served people. From such preposition, he provided "10 recommendations on how to improve forest education: (1) Strengthen the science-policy interface in order to be able to provide policy solutions for decision makers; (2) Provide a good understanding of the role of forests and forest management in addressing global challenges; (3) Educate cross-sectoral approaches and provide tools for managing forests in the broader landscape context; (4) Reach out to other sectors that impact forests such as agriculture, mining or infrastructure; (5) Constantly adapt and build on, but leave old paradigms; (6) Recognize that long-term economic sustainability depends on ecological sustainability; (7) Contribute to fair benefit sharing and address imbalances in nature resource consumption between North and South; (8) Promote innovative, multicultural thinking and provide students with communication and negotiation skills; (9) Acknowledge the great knowledge of local communities and indigenous peoples; and (10) Include more expert from outside the forest sector" (ibid., 24-25).

During the discussion, almost everybody observed the significance in forest education. Traditionally, forest schools were training students for forest management in its various functions, but today, forest education required more comprehensive consideration of the needs of society and forests as part of nature beyond forest management. Thus, it was necessary to train the students for a broader array of occupations/professions. It required not only continuous updating of the training contents, but the expansion of nonspecific abilities (such as communication skills) and operational competences that would enable graduates to address new, complex problems. Many good examples of universities, which had successfully reformed their curricula, were mentioned during the discussion. It was stressed that such best practices should be transferred and replicated in other places. Besides, it was noted that innovative approaches, including e-Learning and Open Education Resources, should be utilized in forest education. A hope was expressed that in spite of the trend towards decreasing numbers of forest graduates, the International Year of Forests 2011 would give a unique chance to raise awareness of forests, their significance and contribution to sustainable development.

In closing remarks, Professor Don Koo Lee thanked the speakers and participants for their contributions. He underlined that ultimate changes were needed to maintain the relevance of forest education in the future. In that context, he pointed out that a wide range of issues, highlighted during the session, should be taken into consideration for meeting the goals of forest education. He also noted that the President's Discussion had identified important areas for future work of IUFRO on forest education.

On August 23 to 28, 2010, there were 37 business sessions and on August 24-25, 2010, 41 side-events enabled their participants to discuss a broad range of up-to-date information about forest

science and policies. On August 27, 2010, all IUFRO Divisions discussed issues related to their research units. "During this Congress a major change was made in the presentation of the IUFRO Outstanding Doctoral Research Award (ODRA) and the IUFRO Student Award for Excellence in Forest Sciences (ISA). Instead of the usual roll call of recipients coming to the stage to receive their awards, this year's awards were made during a special sub-plenary session where award winners were first presented with their awards followed by a panel discussion. During the panel discussion, the award winners had an opportunity to present short overviews of their award winning research, and discuss the motivation, challenges and experiences in conducting their research" (IUFRO 2010a, p.97).

At the Sub-Plenary Session: *SP-15 IUFRO award winners – the next generation*, the IUFRO ODRA was granted to the following eight recipients:

- Guillermo Gea Izquierdo (Spain) working at Swiss Federal Research Institute, won the Award for his research on silvopastoral models for western Iberian open woodlands;
- Marieka Gryzenhout (South Africa, University of Pretoria-FABI) – for evaluating the taxonomy of a group of important tree pathogens;
- Jiali Jiang (China, Chinese Academy of Forestry) – for her research on the effects of temperature, time and frequency on the dynamic viscoelasticity of wood;
- Finnvid Prescher (Sweden, Svenska Skogplantor AB) – for research on models to improve seed orchard management and seed procurement;
- Andreas Schindlbacher (Austria, Federal Research and Training Centre for Forests, Natural Hazards and Landscapes) – for research on the effects of soil warming on greenhouse gas emissions in the northern Austrian Alps;
- Jürg Andreas Stückelberger (Switzerland, EcoEng Ltd.) – for research on a forest road network design model which determines the set of Pareto-optimal solutions between forest harvesting costs and negative ecological impacts caused by road construction and timber harvesting in mountainous European areas;
- Guillermo Trincado (Chile, Universidad Austral de Chile) – for developing a dynamic model of crown, branch and knot formation in loblolly pine essential for forest management and industrial conversion processes;
- Feng'e Yang (Canada, Ontario Ministry of Natural Resources) – for her economic analyses of Ontario's stumpage pricing system.

At the same sub-Plenary session, three students received the ISA:

- Tnah Lee Hong (Malaysia, Forest Research Institute – FRIM) – for her research on a DNA profiling database designed to identify sources of illegally logged timber;
- Marco A. Contreras (USA, University of Montana) – for devising an innovative optimization technique to solve forest transportation planning problems which took into consideration minimizing harvesting and transportation costs and social and ecological impacts; and
- Mahbubul Alam (Bangladesh, Ehime University) – for research on the management and economics of "home gardens" in Bangladesh.

During the Congress, the Distinguished Service Awards (DSA) were granted to Dr. Jung-Hwan Park and Dr. Seung-Jin Suh (both from the Republic of Korea) and Dr. John Parrotta (USA). It should be mentioned that after the Congress in Brisbane, the DSA was granted to Professor Klaus von Gadow and Dr. Axel Roeder (both from Germany); Dr. Jack R. Sutherland (Canada) and Dr. Dennis P. Dykstra (USA) in 2006; and to Markku Aho (Finland) and Dr. Karel Vančura (Czech Republic) in 2009.

The winners of the Best Poster Award were:

- D1 – Pifeng Lei (University of Freiburg, Germany) B24-P06: "Belowground niche separation and productivity in trees species mixtures";

- D2 – Yoshihiro Hosoo (Shinshu University, Japan) Poster B10-P12: “Isolation and analysis of a gene encoding a potassium membrane transport protein from Cryptomeria japonica;
- D3 – no winners;
- D4 – Sungho Choi (Korea University, Republic of Korea) A12-P04: “Predicting the changes in forest distribution using the thermal and hydrological indices”;
- D5 – Lee Su-Yeon (Seoul National University, Republic of Korea) E-Other-P24: “Analysis of terpenoids released during the drying process of Cryptomeria japonica”;
- D6 – Maija Faehnle (Finnish Forest Research Institute, Finland) Poster H02-P04: “Evaluating the use of social information in urban forest planning”;
- D7 – Yukiko Takahashi (The University of Tokyo, Japan) G19-P09: “Genetic diversity of the pathogen of Japanese oak wilt, Raffaelea quercivora, in the gallery bored in an oak tree, and mycangia of the ambrosia beetle, Platypus quercivorus”;
- D8 – Ahn Young San (Korea Forest Research Institute, Republic of Korea) C14-P01: “Historical change in sediment yield in Lake Toro catchment, Kushiro-mire, northern Japan over the past 300 years”.

The IUFRO World Congress Host Scientific Award was granted to Sung Gak Hong, tree physiologist and professor at the Kon-Kuk University, for his studies of water relations, effects of root tip removal and cytokinin on K+ transportation in roots of honey locust, super-cooling of woody plant xylem parenchyma. He had practical achievements in the development of substitute for diesel engine fuel by use of tree seed oil, honey resources, and biomass. He was qualified for the membership of the National Academy of Sciences, Republic of Korea since 1995.

Organizational matters

On August 24 and 27, 2010, the International Council had two meetings. Professor Don Koo Lee, IUFRO President, reported to the Congress at its Closing Ceremony that the International Council had adopted changes in the IUFRO structure (IUFRO Statutes and Internal Regulations), elected new officeholders, adopted the IUFRO Strategy for 2010-2014 and the 2010 Congress Resolution.

The Seoul Resolution, entitled: *Forests for the Future: Sustaining Society and the Environment* and consisting of six thematic research areas, approved by the International Council, urged IUFRO members and other stakeholders to renew their strong assurance of global collaboration in the face of emerging global challenges.

As for the IUFRO Statutes and Internal Regulations, it should be mentioned that in April 2009, the International Council adopted a number of revisions and amendments to the Statutes, including important points, relating to:

“1) Roles and responsibilities of IUFRO Board members, e.g. one Vice-President oversees Divisions, other Vice-President oversees Task Forces, Special Programmes, Projects and IUFRO-led Initiatives; the Executive Director as a non-voting Board member; and the Enlarged Board only to meet at the beginning and the end of the Board period.

2) Replacement of General Board Members by five President’s Nominees (PN) having specific tasks.

3) Appointment of Deputy Division Coordinators; and term of office of IUFRO officeholders.

4) Management Committee (MC) taking the responsibilities of the former Finance Committee or Finance Officer.

5) Abolishment of the Advisory Council.

6) Amendment of membership categories.

7) Quorum required for decisions of the International Council.

8) Split of Division 6 into two separate Divisions 6 and 9[290]" (IUFRO Statutes and Internal Regulations 2011, p.1).

9) It was also decided that the newly elected IUFRO President would start to perform since the election.

The International Council and the Congress adopted the following decisions: Dr. Niels Elers Koch, Director General, Danish Centre for Forest, Landscape and Planning, Denmark, was elected new IUFRO President (2010-2014); Mike W. Wingfield, South Africa was elected IUFRO Vice-President, responsible for Divisions; and Su See Lee, Malaysia, was elected Vice-President responsible for Task Forces, Special Programmes, Projects and IUFRO-led Initiatives.

The Honorary Membership was conferred upon two outstanding IUFRO officeholders: Professor Risto Seppälä, Immediate Past President (the 24th IUFRO President), and Dr. Eric Teissier du Cros, former Vice-President Science (2001 to 2005).

At its meeting in Seoul, the Board recommended Salt Lake City as the host of the IUFRO Congress in 2014. The IUFRO IC endorsed the recommendation; after voting in a secret ballot, Salt Lake City, USA was selected for hosting the next IUFRO Congress on October 5-12, 2014.

Dr. John Parrotta, Chair of the Congress Scientific Committee, read out the 2010 Congress Resolution, hightlighting IUFRO's commitment to promote the themes of the new IUFRO Strategy: forests for people; climate change and forestry; bio-energy; forest biodiversity conservation; forests and water interactions; and forest resources for the future.

Incoming President Niels Elers Koch introduced the new Board and President's nominees.

The elected nine Division Coordinators/Members of the Board who would take office between 2010 and 2014 were: D1 – Björn Hånell (Sweden), D2 – Yousry El-Kassaby (Canada), D3 – Hans Heinimann (Switzerland), D4 – Margarida Tomé (Portugal), D5 – Andrew Wong (Malaysia), D6 – Tuija Sievänen (Finland), D7 – Andrew Liebhold (USA), D8 – Jean-Michel Carnus (France), and D9 – Daniela Kleinschmit (Sweden/Germany).

The President nominated the following Board Members: José Campos (Costa Rica), Ben Chikamai (Kenya), Elena Kulikova (Russia), Shirong Liu (China) and Ulrike Pröbstl (Austria).

President elect Niels Elers Koch complimented on immediate past IUFRO President Don Koo Lee for his excellent leadership of the past five years. As the incoming IUFRO President, he pledged to contribute to a better and more peaceful world by extending opportunities for global forest scientists. Koch cited active partnership and collaboration as one of IUFRO's strengths saying that the strong IUFRO team would perform important tasks altogether under the IUFRO Strategy 2010 – 2014, which reflected the new, clear and ambitious mission of IUFRO for forest scientists and decision-makers. He expressed his commitment to promote networking focusing on the six thematic areas. He mentioned the importance of thinking outside the forest box as forest science was highly cross-sectoral, and the resulting collaboration as an effective platform for global network and in tackling shared challenges. He reached out to IUFRO members for their support in achieving his goals as IUFRO President, particularly in close cooperation and partnerships with FAO, CIFOR, IFSA and others. He concluded his remarks by vowing to do his utmost in strengthening the global forest network (IUFRO 2010a, pp.10-11).

The IUFRO flag was lowered, and President D.K. Lee handed it to Dr. Ann Bartuska (Deputy Chief, USDA Forest Service) and Professor Perry Brown (University of Montana), representatives of the USA, received the flag on behalf of the United States, the next host country. In her speech,

[290] D6: Social Aspects of Forests and Forestry and D9: Forest Policy and Economics.

Dr. Bartuska described American diversity in culture, music, people, landscapes and land ownership, such challenges as bark beetle and forest fire issues, and Salt Lake City, Utah, as the host city of the XIX Winter Olympic Games in 2002, and finally, the venue and draft Program of the Congress.

Resolutions

The outcome documents of the 23rd IUFRO World Congress were the Seoul Resolution and the IUFRO Strategy for 2010-2014, primarily aimed at answering global challenges.

XXIII IUFRO World Congress
August 23-28, 2010, Seoul, Republic of Korea
THE SEOUL RESOLUTION

The XXIII IUFRO World Congress "Forests for the Future: Sustaining Society and the Environment" provided a unique forum for presentation and discussion of the results of current global research related to forests and trees. The Congress explored a broad range of current and emerging issues of great importance for the future of forests and their capacity to provide the environmental, economic, social, cultural, and health benefits that sustain rural and urban societies worldwide.

During this historic *International Year of Biodiversity*, in anticipation of the upcoming *International Year of Forests*, and recognizing the vital role that forest science must play in meeting the common challenges we face worldwide, IUFRO commits itself to: Focusing more on scientific research and international collaboration in six thematic areas: Forests for People; Climate Change and Forestry; Bio-Energy; Forest Biodiversity Conservation; Forests and Water Interactions; and Forest Resources for the Future.

Further, IUFRO commits itself to the following goals:

– Improving communication within the IUFRO structure, with other scientists, students, forest professionals, and the public; and increasing visibility and accessibility of research findings;

– Expanding and deepening IUFRO's work at the science-policy interface by enhancing scientific contributions to international processes, conventions, and organizations; responding rapidly to new policy issues; expanding partnerships and collaborating with international organizations and processes through the provision of scientific information and policy options;

– Urging member institutions and external stakeholders to renew and strengthen forest monitoring activities and support global monitoring efforts;

– Improving IUFRO's capacity to expand its membership and funding base to provide support for the full range of IUFRO's activities to benefit the forest researchers belonging to IUFRO's member organizations; and

– Promoting high-quality forest-related research and expanding IUFRO's capacity for interdisciplinary cooperation; strengthening scientific capacity; relating the work of all IUFRO units to the six thematic areas; broadening IUFRO's membership base; and identifying emerging issues and changing paradigms (IUFRO 2010a, p.328).

IUFRO Strategy for 2010-2014

The Congress discussed the IUFRO Strategy for 2010-2014: *Reading the pulse of forest science for the benefit of forests and people* (IUFRO Strategy 2010). In the Foreword to the Strategy, Don Koo Lee, Immediate Past President, and Niels Elers Koch, IUFRO President, emphasized the importance of such strategic guidelines for IUFRO further development and strengthening. They also noted that the IUFRO Strategy for 2006-2010 (IUFRO Strategy 2006) was the centrepiece of all activities of the Union during the five years between the Congresses.

The three Institutional Goals adapted from the previous Strategy reflected IUFRO's

commitment to high-quality science and interdisciplinary cooperation, to better visibility of science-based research findings and increased ability of responding to new and unexpected issues:

Goal 1: To strengthen research and expand IUFRO's capacity for interdisciplinary cooperation

Goal 2: To strengthen coordination within the scientific community and increase visibility of science-based research findings

Goal 3: To further strengthen IUFRO's work at the science-policy interface.

In line with the recommendations of the Review Panel, the Strategy 2010-2014 was composed of two parts. Part I: *Research Goals* was focused on six thematic areas; and Part II: *Institutional Goals* provided a strategic outline of IUFRO for the years to come and set out related actions for implementation (IUFRO 2010, p.10, 12).

The Strategy clearly stated the IUFRO Vision: "As the global network for forest-related research to serve the needs of all forest researchers and decision makers" and IUFRO Mission: "IUFRO promotes global cooperation in forest-related research and enhances the understanding of the ecological, economic and social aspects of forests and trees, including wood and non-wood products, goods and services. It disseminates scientific knowledge to stakeholders and decision-makers and contributes to forest policy and on-the-ground forest management" (IUFRO 2010, p.13).

With the Strategy for 2010-14, IUFRO addressed Research and Institutional Goals at the same time. The Research Goals strongly focused on the following six thematic areas: (1) Forests for People; (2) Forests and Climate Change; (3) Forest Bioenergy; (4) Forest Biodiversity Conservation; (5) Forest and Water Interactions; and (6) Resources for the Future. Each Thematic Area (TA) had the following special emphasis areas (EA):

TA 1: *Forests for People* – (Agro) Forestry, food security and livelihoods (including fuel wood); Forests and human health, recreation and nature-based tourism; Economic benefits through the use of forests, goods and services; and the role of forests in landscapes and in urban areas.

TA 2: *Forests and Climate Change* – Climate change impacts on forest ecosystems (including insects and pathogens) and forest-dependent people; Feedbacks between land cover dynamics, forest disturbance processes and climate change (e.g. C, aerosol emissions, albedo changes); Options for adaptation and trade-offs between adaptation, conservation and/or socio-cultural needs; Reducing Emissions from Deforestation and Forest Degradation (REDD), and other opportunities for carbon mitigation, including governance and institutional arrangements.

TA 3: *Forest Bioenergy* – Resource competition, environmental and social impacts, cascades of use and life cycle analysis; 'Eco-efficiency' of forest bioenergy production systems and technologies; Marketing of bioenergy and economic impacts.

TA 4: *Forest Biodiversity Conservation* – Impacts and effects of biodiversity loss at various levels, including genetic resources; Landscape-level strategies for biodiversity conservation (including fragmentation, conflicting land uses, role of plantations for biodiversity conservation, etc.); Ecosystem services of forest biodiversity, forest ecosystem resilience and adapted forest management for protected areas.

TA 5: *Forest and Water Interactions* – Effects of land-use and land-cover change on watershed hydrology; Forest and water interactions under conditions of climate change, and response options; Region specific interactions of forests and water (incl. water consumption of forest plantations, erosion); Riparian and coastal ecosystems.

TA 6: *Resources for the Future* – Trends in demand for innovative forest products, ecosystem goods and services and conflicting needs; Management options (including conservation, avoided degradation, restoration concepts); Globalization and changes in governing systems (ibid., p.15-21).

In Part II, the three Institutional Goals, their objectives and actions for implementation were described in detail.

This Strategy determined IUFRO activities for 2010-2014. The Union suggested implementing it through its member organizations, primarily through strong national forest research institutions and good international cooperation because never before so many people had required so many different goods, forest products and services. Thus, strong national forest

institutes/universities with stable financing were needed; and good international cooperation in forest research was necessary at the global (IUFRO) and regional (e.g., COST Action Program, the EU, etc.) levels.

Excursions

On August 26, 2010, 96 buses took 1,355 delegates and 150 staff members to eight in-Congress tours across three provinces. Those one-day tours enabled the Congress participants and accompanying persons to explore Korea's biodiversity, visit an experimental forest site, a tree breeding facility, a forest education centre, an ancient royal forest preserve, a chestnut plantation, a recreational forest, and a successfully reforested area as well as to see Korea's reforestation and traditional Korean culture. It should be noted that later a colourful and informative In-Congress Tour Brochures were included in the Congress Report (IUFRO 2010a, pp.182-245).

In addition, six one-day tours were organized for those who had free time. The following tours were chosen by 54 participants: Korean Wave; History of Dolmen; Demilitarized Zone (DMZ) Tour; Korean Antique Art & Culture; OD-05 Traditional and Modern Tour; Traditional and Modern; Visit to the *Korea House*. For accompanying persons, other five tours were organized, mostly in City of Seoul and attended by 97 people.

The eight Post-Congress Tours were attended by 163 persons and their destinations included Korea, China, Japan or Mongolia.

Route 1. Historical Sites in Andong and Gyeongju. 3 days, 35 participants.

This tour took participants to Gyeongju and Andong, the two most popular destinations in the traditional sphere of Korean tourism, located in south-eastern Korea. The historical cities were located at a distance of a 5-hour drive away from Seoul. As the capital of the Silla Kingdom for almost one thousand years, Gyeongju still maintained a variety of significant historical heritage sites. Highlights of this tour included the visits to the Gyeongju National Museum as well as Bulguksa Temple and Seokguram Grotto, both of which were UNESCO-designated World Heritage sites. Participants visited the Andong Hahoe Village, which preserved the housing architecture and village structure of the Joseon Dynasty, and the Andong Folk Museum, the home of Confucianism. The Seonghwangnim Forest, representing the Korean forests of the temperate zone, was also visited.

Route 2. Seoraksan National Park. 3 days, 42 participants.

This tour featured the spectacular scenery of the Seoraksan National Park with a size of 398,539 km^2, nearby cities and the ocean. The National Park offered amazing scenic views throughout the four seasons. Daecheongbong (1,708 m) was the highest peak in the park and the third highest peak in Korea. Because of irregular climate and low temperatures, it homed various high mountain plants as well as a variety of wild birds. Daecheongbong offered expansive views of Mt. Seorak. On the way back from the Seoraksan National Park, participants visited the coastal city of Sokcho. They went to the Naksansa Temple, boasting a 1,300-year long history and Sokcho Beach, displaying the beautiful view of its glassy water, white sand and pine forests. On the return journey, they visited the Goseong Unification Observatory, the closest location to North Korea, where they had a glimpse of many peaks of Mt. Geumgang.

Route 3. Jeju Island. 3 days, 36 participants.

Participants flew one hour from Seoul to Jeju, Korea's largest island. Created by volcanic eruptions, the Island was considered the most popular travel destination among tourists from abroad. It had a temperate climate, warmer than in inland Korea. The tour included visits to Cheonjeyeon Waterfalls, named 'the pond of God,' and Jusangjeolli Cliff, stone pillars, piled up along the coast. Day 2 included a visit to the natural Bijarim Forest where 2,570 nutmeg-yew trees (*Torreya nucifera*) aged between 300 and 800 years grew. Then participants had a visit to the lava tunnel of

the Manjang Cave and Jeju Stone Park where they could learn about the volcanic and geological history of the Island. Day 3 included Seongsan Ilchulbong (Peak), one of the most fascinating tourist spots of the Island. Seongsan Ilchulbong rose from under the sea in a volcanic eruption over 100,000 years ago. They saw a huge crater, 600 m in diameter and 90 m in height, from the top of the Peak. They discovered the fantastically shaped rocks, decorating the seashores, hundreds of Oreums (secondary volcanoes) and the rarest species of flora around the Island.

Route 4. Wooden Architecture in Yeongju and Hapcheon. 3 days, 5 participants.

This tour was meant for those who were interested in Korea's wooden structures. The tour took participants to Yeongju blessed with the natural beauty of Mt. Sobaek and dozens of valleys. The city tour included a visit to the Buseoksa Temple. Built in 676, Buseoksa was the oldest wooden temple in Korea and had great value as Buddhist architecture. It differentiated itself from other temples in particular by its huge size. They also saw a diverse array of designated National Treasures inside the temple. They stopped over in Andong, the most popular historical cities in Korea. A tour of Andong included a visit to the Andong Hohoe Village that preserved the housing architecture and village structure from the Joseon Dynasty and the Andong Folk Museum, the home of Confucianism. The final destination of the tour was Hapcheon, renowned for its Haeinsa Temple, where the Tripitaka Koreana was enshrined. The Tripitaka Koreana (woodblocks) was a comprehensive collection of Buddhist scriptures, including doctrines of Buddhism.

Route 5. Forest Health in Paju, Pyeongchang and Uljin. 3 days, 17 participants.

This tour was an excellent option for participants who had interest in insect pests and diseases. The tour took participants to a natural Quercus mongolica forest that had been damaged with the Korea Oak Wilt disease (*Raffaelea quercus-mongolicae*). The second technical site was a Pinus densiflora forest damaged by the pine needle gall midge (*Thecodiplosis japonensis*). They had a chance to share their knowledge and experiences in controlling those insect pests and diseases. On the East Coastal Highways with a fantastic ocean view, they travelled to the Bulyeongsa Temple, an old Buddhist temple, built in 651. The temple was also famous for a majestic Pinus densiflora stand, surrounding the site. The tour also included a visit to the Buseoksa Temple, well known for having one of the oldest wooden buildings in Korea. On their way back to Seoul, they visited Seonbi-chon, preserving the housing and village structure of Joseon Dynasty's scholar class and Danyang Palgyeong (eight wonders) being noted for its picturesque peaks and rocks.

Route 6. China. 4 days, 15 participants.

Participants enjoyed both the historical and technical aspects of Beijing. The tour took them to a theatre to enjoy Shaolin Kung Fu, the famous Chinese martial arts. Then, they visited the Forbidden City, home of the Emperor of China for almost five centuries, and the Summer Palace which was declared a masterpiece of Chinese landscape garden design by the UNESCO. They also visited the Great Wall of China. The tour included a visit to the Badaling Forest Farm, located at the foot of the famous Badaling Great Wall, one of the preeminent World Cultural Heritage sites.

Route7. Japan. 4 days, 7 participants.

For those hoping to expand their oriental experience, the tour offered a chance to enjoy the unique Japanese culture and natural landscape. Participants flew directly from Seoul to Narita. After arriving in Narita, they went to the Naritasan Shinshoji Temple and then visited the luxurious and elaborate Toshogu Shrine in the Ueno Park in Tokyo. The shrine was selected as a technical site and as a cultural and historic spot for its endless Japanese cedar-lined road and centuries-old wooden buildings. A Tokyo City tour was also included in this journey, providing participants with a chance to visit some of the most popular tourist spots of Tokyo, such as the Meiji Shrine, Edo-Tokyo Museum, Ueno Onshi Park and Odaiba Artificial Island.

Route 8. Mongolia. 4 days, 6 participants.

The trip to Mongolia was the right choice for those with adventurous spirit. The land of Genghis Khan, the Mongolian Emperor, whose empire was composed of mountains, desert, and steppe so that participants could have exceptional experience to enjoy the natural wonders, journeying by car, on foot, or on horseback. They visited the Gandan Monastery, the largest and the most important monastery of Mongolia with over 400 monks in residence, and the Natural History Museum, Mongolia's first national museum showing the origin of plants, animals and humans. They also visited the Terelj National Park where they could experience horseback riding, making their visit to Mongolia more enjoyable and unforgettable (IUFRO 2010a, pp. 39-42).

Russian participation

Some 20 people were from Russia, mostly representatives of the Federal Forestry Agency, academia and civil society organizations: Alexander Yu. Alexeenko from (Far East Forestry Research Institute, Khabarovsk); Galina F. Antonova, Natalia I. Kirichenko, Alexander A. Laletin, Elena N. Muratova, Alexandr A. Onuchin, Iraida N. Tretyakova and Nadezda M. Tchebakova (Sukachev Institute of Forest, Siberian Branch, RAS, Krasnoyarsk); Vladimir N. Dyukarev, Tatiana A. Komarova and Olga N. Ukhvatkina (Institute of Biology and Soil Science, Far Eastern Branch, RAS, Vladivostok); Sergey V. Kopeyko (*Roslesinforg*, Moscow); Andrey P. Laletin (*Friends of the Siberian Forests*, Global Forest Coalition, Krasnoyarsk); Viktor G. Sanaev, Valentin S. Shalaev and Vladimir V. Nikitin (Moscow State Forest University); Anatoly I. Pisarenko (Society of Russian Foresters, Moscow); Rodin, Sergey A. – Russian Research Institute of Silviculture and Forestry Mechanization; Pushkino, Moscow Region; Roshchin, Boris V. and Starostin, Stanislav V. – Russian Federal Forestry Agency, Moscow.

It should be noted that foreign companies were actively recruiting Russian forest specialists to work for them. For this reason, the Congress was attended by Russian experts who were registered as representatives of other countries, e.g.: Alexander Moiseev, Mikhail Kozlov and Elena Zvereva (Finland); Victor Teplyakov (Republic of Korea); Maxim Lobovikov (Italy); Anatoly Shvidenko (Austria); Oleg Panferov (Germany); and Alexander Belokurov (Switzerland).

Russian forest scientists submitted 22 papers and posters, including in co-authorship; and they are listed below in the alphabetical order by the name of the first Russian author:

1. Alexeenko, A. The effective method of forming the Korean pine forests;
2. Liu, H., Wu, X., Anenkhonov, O. Warming-determined spatial and temporal patterns of forest dieback in Inner Asia;
3. Antonova, G., Jeleznichenko, T., Varaksina, T. Deposition of lignin during early and late xylem formation in Scots pine;
4. Dymov, A., Lapteva, E. Boreal forest soils change criteria under logging in Komi Republic;
5. Park, J.H., Woo, S.Y., Han, R.K., Dyukarev, V. Effects of climate change on soil respiration according to the vegetation after forest fire of boreal forest;
6. Kirichenko, N.I., Péré, C., Tomoshevich, M.A., Baranchikov, Yu.N., Kenis, M. Detection of alien insect pests and diseases on European and North American woody plants in Siberia;
7. Laletin, A., Laletin, A., Bocharnikov, V.N. Some examples of traditional forest-related knowledge from Russian Siberia;
8. Laletin, A.A., Laletin, A.P., Sokolov, V.A., Laletina, I.D. Role of Krasnoyarsk region's forests in the global account of the main greenhouse gasses;
9. Lepeshkin, E.A., Smirnov, D.Y. Undisturbed *Pinus koraiensis*–broadleaved forest in the Bikin River valley as a base for preservation of forest ecosystems and a model for SFM;

10. Lopatin, E., Kolström, T. Application of low-cost UAV for silvicultural forest management;
11. Lopatin, E., Kolström, T., Spiecker, H., Kahle, H.P. Long-term trends in wood production of Siberian spruce and Scots pine in the Komi Republic (north-western Russia Federation);
12. Muratova, E.N., Sedelnikova, T.S., Kvitko, O.V., Sizikh, O.A., Pimenov, A.V., Karpjuk, T.V. Karyotype diversity in *Larix* species;
13. Panferov, O., Junghans, U., Knohl, A., Olchev, A., Sogachev, A., Varlagin, A., Vygodskaya, N., Ahrends, B. Effects and feedbacks of natural and anthropogenic structure changes in boreal forest ecosystems;
14. Saastamoinen, O. and Teplyakov V.K. Moral diversity and universalism in the world of forests;
15. Sanaev, V.G. Professional training in the forest sector of Russia and the prospects for forest education development;
16. Sanaev, V.G., Shalaev, V.S., Chumachenko, S.I., Yakovleva, A.I. Moscow State Forest University as a Russian coordinator of Global Forest Informational Service (GFIS);
17. Tchebakova, N.M., Parfenova, E.I. Potential land cover change in Siberia in a warmed climate and its feedback to surface albedo;
18. Teplyakov V.K. Forest transition in Russia;
19. Teplyakov V.K. Russian Far East forests use and rehabilitation: a new dogma or an old problem?
20. Teplyakov V.K. What is the future of "forest dynasties" in Russia?
21. Tretyakova, I., Barsukova, A., Sirenko, A., Noskova, N., Ivanizka, A., Shalaev, E. Perspective of biotechnology of somatic embryogenesis of coniferous species for plantation forestry in Russia;
22. Ukhvatkina, O.N., Omelko, A.M. Dynamics of Korean pine stands in mixed forests.

In addition, Professor Victor K. Teplyakov made a presentation under the title: *Forest transition in Russia* at session D-14 (Comparative analysis of forest sustainability transitions in developed and developing countries). He overviewed the forest transition in Russia as associated with a number of factors, including forest and population distribution, land use and forest composition change over the last few centuries as well as uneven forest cover and its fluctuation in different parts of Russia (IUFRO 2010a, p.141).

Interesting facts

The Congress was held in Seoul, the capital of the Republic of Korea, in one of the largest buildings for such events – Convention and Exhibition Center (COEX), located in the centre of city. COEX was a multi-functional four-level building of 225,000 m^2 with four underground levels.

Behind the scenes, the management was working hard to paint COEX 'green'. Special software analysed gas, electrical, and water use to calculate the most efficient ways to maintain the facilities. Grey water was recycled for re-use in toilets, cutting carbon emissions by 83 tons a year. Alternative energy experiments were also under way, including the use of solar energy generators, solar-powered streetlamps, and a wind turbine. In addition, more than 1,490 fluorescent and incandescent lights had been replaced with LED lighting, cutting CO_2 emissions by 52 tons a year (IUFRO 2010a, p.275).

According to the Congress "Fun Facts" and other statistics, the Congress had 170 sessions; 2,027 presentations; 1,054 posters; 82 industrial companies and organizations from 13 countries exhibitted their products and technologies at 242 booths, scoring 13,139 visitors; some 70 publishing

agencies were accredited for the Congress; the distance to the farthest delegate from Uruguay was 19,594 km; and the rainfall during the Congress was 183.5 mm (IUFRO 2010a, p. 285).

As of the Congress time, IUFRO united 15,000 research workers in 641 member organizations and 149 Associate Members from 110 countries.

Forests covered almost two-thirds of the country's territory (65%). "Within the modest area of 99,000 km^2, Korea boasted a rich diversity of animal and plant life. To date, 33,253 species were identified divided among 21,168 animals, 4,130 plants, 2,078 fungi, 4,657 protists, and 1,219 prokaryotes" (IUFRO 2010a, p.271).

Biological and cultural diversity were hightlighted on the commemorative envelopes and postage stamps prepared especially to mark the Seoul Congress, including a seven-colour octagonal stamp, showing people and animals among trees to illustrate the stamp's theme: *Trees and Life*. A full 16-stamp sheet of these stamps was included in the delegate's registration package. This gift was brought to the participants also with the help of the Korean Postal Agency.

Chapter 30
Congress XXIV – October 5-11, 2014, Salt Lake City, USA

This Chapter draws primarily from the Newsletter and the Program of the 24th IUFRO World Congress (IUFRO 2014a, b), abstracts of the papers (IUFRO 2014c), Daily News (IUFRO 2014d-h), Internet resource (http://iufro2014.com), Congress Program Summary Report (IUFRO 2014i), and impressions shared by participants of the IUFRO Congress (Шалаев, Санаев, Никитин 2014; Муратова, Антонова 2014).

Overview

The 24th IUFRO World Congress was held under the title: *Sustaining Forests, Sustaining People: The Role of Research*. Key partner organizers of the Congress were the U.S. Forest Service, the National Association of University Forest Resources Programs, the Society of American Foresters, and the Canadian Institute of Forestry.

The Congress was attended by 2,492 scientists and experts, and almost 700 students. Europe was the most represented region among the 100 countries participating with its 32 countries, followed by the Asia-Pacific region (27), Africa (21), Latin America and the Caribbean (18 countries), and North America (2 countries).

When the scientific agenda was drafted, the Congress Organizing Committee received nearly 4000 abstract submissions for verbal and poster presentations – the highest number ever for a IUFRO Congress. Among the 20 abstracts submitted by scientists from Russia, 11 applications came from representatives of academic institutions, 5 from NGOs, and 4 from Universities, including two from the Moscow State Forest University (IUFRO 2014a, b).

"The number of oral and poster presentations, and the diversity of their authors, was unprecedented. In response to the open call for abstracts in late 2013, more than 3,900 abstracts were received, of which over 3,600 were accepted following a two-stage review process by session organizers and the Congress Scientific Committee. These included 740 abstracts by lead authors from the United States and Canada, 435 from 20 countries in Latin America and the Caribbean, 970 from 34 countries in Europe, 410 from 27 countries in Africa, 968 from 26 countries in Asia, and 82 from the Australia-Pacific region" (IUFRO 2014i, p.25).

The Congress Program included 5 plenary, 19 sub-plenary and 168 technical sessions, where a record number of 1,245 papers and 1,192 posters were presented. A number of interesting excursions were organized before, during and after the Congress.

Scientific program

Actually, the Congress started on Sunday, October 5, 2014, in the afternoon with the tree planting ceremony to commemorate the 24th IUFRO World Congress. In accordance with IUFRO tradition, four trees were planted: cedar of Lebanon (*Cedrus libani*), European beech (*Fagus sylvatica*), piñon pine (*Pinus edulis*), American chestnut (*Castanea dentata*), and big-tooth maple (*Acer grandidentatum*). The ceremony was held in the Salt Lake City International Peace Gardens, established in 1947, displaying gardens of 28 countries and maintained by the Salt Lake City Parks Department.

The Ceremony was attended by the following officials: Niels Elers Koch, IUFRO President; Robert Bonnie, USDA Undersecretary for Natural Resources and the Environment; Thomas Tidwell, Chief of USDA Forest Service (USFS); Brian Cottam, Utah State Forester; and Todd Reese, Director of Salt Lake City Parks and Public Lands Program (IUFRO 2014d).

In the morning of October 6, 2014, Native Americans of five tribes indigenous to Utah welcomed the Congress with traditional flute music, dance, and song. *A Tribute to America's Forest* was the title of the 10-minite film, shown to the audience. Then, Steve Bullard, President, National Association of University Forest Resources Programs, and Jimmy Reeves, Deputy Chief for Research and Development, USFS, raised the IUFRO flag.

In the opening address, IUFRO President Niels Koch welcomed over 2,500 delegates and recalled his first IUFRO Congress in 1976 in Norway when he was 25 years old. He pointed out how this had changed the rest of his life for the better as he had met the best scientists in his field and colleagues who had become his best friends at the Congress. He gave a brief overview of the 24th IUFRO World Congress Program, shared statistics and declared the Congress open.

Then, Tom Tidwell, Chief, USFS, spoke on behalf of the host country and underlined the importance of partnerships and the influence of national sound forest science on the future of sustainable forest management in the country.

Robert Bonnie, USDA Undersecretary for Natural Resources and Environment, presented many cases, underlining the role of research in forest restoration, conservation and sustainable use in the USA. He stressed that in the USA, the forest fire seasons had become 60-80 days longer than thirty years ago, and that interested parties needed to find decisions when 'science and research would light the way'.

Other addresses were delivered by representatives from IUFRO partner organizations: UNFF (Thomas Gass, Assistant Secretary General for Policy Coordination and Inter-Agency Affairs, Department of Economic and Social Affairs, United Nations); FAO (Eduardo Rojas-Briales, Assistant Director General for Forests); and IFSA (May Anne Then, President).

During the Opening Ceremony, the IUFRO World Congress Host Scientific Awards were presented to three renowned USA scientists: Dr. Harold E. Burkhart (University Distinguished Professor, Department of Forest Resources and Environmental Conservation, Virginia Polytechnic Institute and State University), Dr. Stephen Hubbell (Distinguished Research Professor , Ecology and Evolutionary Biology, UCLA, and Senior Staff Scientist, Smithsonian Tropical Research Institute, Panama), and Dr. Chadwick Dearing Oliver (Pinchot Professor of Forestry and Environmental Studies, Director, Global Institute of Sustainable Forestry, Yale School of Forestry and Environmental Studies).

When asked about the future of forestry research, the recipients spoke of a range of needs from technical advances to increased social support for conservation. Undaunted, Dr. Burkhart focused on the great possibilities that lie ahead: "I believe there are more opportunities in forest science than ever before because there is more pressure on our forests than ever before; regardless of specialty, there is a brilliant and bright future for forest research'." (IUFRO 2014e).

The IUFRO SAA was granted to the following 10 scientists (IUFRO News 2014a):

- Dr. Sally Aitken (Canada, University of British Columbia) for developing a comprehensive body of theoretical knowledge on the evolutionary biology and adaptation of trees species, and applying this knowledge to the development of methods and tools that allow better decision making in applied forest management.
- Dr. Jürgen Bauhus (Germany, University of Freiburg) for his important research contributions in native, semi-natural and plantation forests. The contributions to biodiversity and mixed-species research helped to increase the social acceptance of forestry.

- Dr. Benjamin Cashore (USA, Yale University) for his many scholarly contributions to the study of the complex array of transnational and non-governmental forces, shaping the way in which forests were governed today, to advance global understanding of the challenges and opportunities of securing these forests for future generations.
- Dr. Richard Hamelin (Canada, University of British Columbia) for his main achievements in the translation of genomics into molecular diagnostic and detection tools, the development of a platform for molecular diagnostics of forest pests, and the monitoring of the impact of transgenic trees on microbial diversity.
- Dr. Christopher Eric Harwood's (Australia, Commonwealth Scientific and Industrial Research Organisation – CSIRO) for significant long-term research and applications to address ecology, genetics, breeding, plantation deployment and wood utilization of Australian tree species. His work advanced understanding of the science that underpinned successful tree breeding which delivered improved germplasm to tree growers in the tropics. His contributions to capacity building in tropical countries were exceptional.
- Dr. Shibu Jose's (USA, University of Missouri) for research which had helped address ecological sustainability challenges of forested ecosystems at local, national and international levels with global impacts. His research program had the overarching goal of identifying and quantifying key ecological processes and interactions that defined ecological sustainability of forested ecosystems.
- Dr. Robert A. Kozak (Canada, University of British Columbia) for his contribution in business topics ranging from wood use in non-residential construction, value-added wood products, supply chain management, forest certification, corporate social responsibility, and most recently, poverty alleviation and community wellbeing. He was a pioneer in the creation of a 'new wave' of business research within the forestry domain, focused on conservation-based business management practices that promoted sustainability of our global forest resources.
- Dr. Aino Anniki Mäkelä Carter (Finland, University of Helsinki) for her pioneering work in dynamic models of trees and stands, which translated material balances and structural models of trees into information and forecasts that were useful to both the research and forest management communities. Much of her early work was summarized in her well-known CROBAS and PIPEQUAL models. The theoretical approaches and practical formulations that she had implemented in those models were now used in many forest models around the world.
- Dr. Jolanda Roux (South Africa, Forestry and Agricultural Biotechnology Institute – FABI) for her expertize on fungal diseases of trees on the African continent and beyond. She had made a huge impact by sharing her scientific expertise in consultations on tree health problems in technologically deprived regions of Africa. By sharing her knowledge, Dr. Roux had made tremendous impact in solving both economically important and ecologically crucial problems in technologically underserved portions of Africa.
- Dr. Giuseppe Scarascia Mugnozza (Italy, University of Tuscia) for his work at the leading edge of forest science focused on understanding the effect of climate change on the forest environment. He had developed new methods for exposing whole trees to elevated atmospheric CO_2, pioneering ecosystem-level assessment of forest productivity and carbon sequestration by eddy covariance. His vision and consensus-building skills were instrumental in developing novel infrastructures for investigation forest responses to climate change under realistic conditions.

On the same day, Martha Isabel 'Pati' Ruiz Corzo, Environmental Campaigner (Mexico)

accepted her Wangari Maathai Award-2014 from the Collaborative Partnership on Forests (CPF)[291] for her pioneering work to preserve forests and alleviate rural poverty in her native country.

The Wangari Maathai Honourable Mention Award was granted to Chut Wutty, Cambodian environmental activist, for his work to stop illegal logging and protect the rights of indigenous forest dwellers. Chut Wutty founded the Natural Resource Protection Group, advocated vigorously against the destruction of the country's natural resources, and encouraged local peoples to guard forests to prevent illegal activities. In 2012, he was killed while escorting journalists to see an area of suspected illegal activity (IUFRO 2014e).

After the welcome address of Dr. Richard Guldin, Professor of Timber Design, Andy Buchanan (New Zealand, University of Canterbury) delivered his keynote presentation about *Modern Timber Buildings for Sustainable Forests*. As "a structural engineer with a broad range of interests in timber engineering, sustainability, fire safety, and earthquake engineering" (IUFRO 2014i, p.21), he underlined the great opportunities of timber constructions, which might be used in modern wooden buildings. With the world's growing population, it was very important for a "green" future of our planet to reduce dependence on energy and CO_2 emissions from energy-intensive materials such as concrete and steel. To promote the design and construction of wooden buildings and engineering structures, it was necessary to develop new wood-based materials, to manage its supply system, to develop research and innovation, and to eliminate institutional barriers. It was not always easy.

The speaker gave an example where many of the underlined problems took place in the construction of modern wooden buildings after the February 2011 earthquake and restoration of Christchurch in New Zealand. The country had well developed forest industries which was largely based on the plantations of radiata pine, and where the growing wood industry paied special attention to wood-based construction materials. However, most of buildings in Christchurch were out of steel and concrete, and after earthquake, many of them were demolished beyond repair. That presented an opportunity to change the future look of the city. The speaker said: "As the city began to rebuild, there was much discussion about the type of city the population wanted. They considered rebuilding all in wood; there is a history in New Zealand of building solely out of wood, because it withstands earthquakes. However, architects are not well-versed in using wood as building material, and there are misconceptions about the flammability of engineered timbers" (ibid., p.21).

The speaker put two questions: "What kind of city do we want?" and "Why can't we use wood to rebuild?" To answer them, he considered the use of engineered wood products such as glulam, laminated veneer lumber and cross-laminated timber. Unlike solid lumber, these products made of wood particles, veneer, or fibres put together with glue, had many benefits. In contrast with steel or concrete, the material or products made of a renewable resource were mostly carbon negative, relatively light weighting and aesthetically good-looking. Perhaps, the most important for the residents of Christchurch was the fact that buildings made of engineered wood held up better under earthquakes than those built of steel and concrete. Such buildings could absorb energy from an earthquake and then return to form, e.g., they bowed but did not break (IUFRO 2014b, e).

New Zealand's universities were engaged in designing and manufacturing wood-made structures, and local engineering companies were the world's leaders in innovation of safe and

[291] At IUFRO Congresses and elsewhere, other awards, instituted by IUFRO Divisions and other organizations and foundations, are presented, e.g., IUFRO Division 7 selects winners for the George Varley Award for Excellence in Forest Insect Research. In 2012, the Award was given to Academician A.S. Isaev. The most common non-IUFRO awards include the Marcus Wallenberg Prize, Sweden, UNEP Sasakawa Prize, CFA (Commonwealth Forestry Association) Young Forester Award, etc.

earthquake-proof constructions. The speaker provided some characteristics of successful research cooperation and state support of business in construction of modern wooden buildings. Demonstration buildings were needed to attract investors and increase the confidence of all participants in the supply chain. Wooden buildings had been proposed for construction in Chicago (42-stories) and Vancouver (30-stories), and 14-storey building in Ottawa was well underway with the support of the Canadian Government (IUFRO 2014c, e).

On October 7, 2014, Dr. David Newbery, Professor of Vegetation Ecology, Institute of Plant Sciences, University of Bern (Switzerland), opened the second Plenary Session by delivering his keynote presentation: *On maintaining cycles and feedbacks in tropical forest ecosystems: Some thoughts from basic research*. He stressed that in spite of the long-standing ecological studies in natural rain forests, there were many interesting ideas for their proper recognition and application for forest management. Relevant recommendations were still largely ignored, and this had important implications for conservation and long-term sustainability. He also stressed that the extensive research in all kinds of tropical forests, their results and conclusions could be useful and effective in summarizing, analysing and scientific positioning. Presentation of ecosystems in the form of a simple, averaged system with no more than three or four key components modelled or changed, could lead to a progress in forestry.

During many years, Professor Newbury had been seeking for a middle way in ecological studies to better use of science. He said: "It is time to return to basic science in forestry. It is time to be more reflective and modest." The research undertaken over the three decades in the tropical forests of Borneo and Cameroon had served to him as inspiration for the creation of a middle ground. He called this an "Aristotelian middle way" for environment-based studies. Ecosystems were dynamic; thus, middle way was required. It was highly desirable to "take stock" and to re-evaluate the research directions. These ideas were not new, but the context and the direct wording required serious revision. The current model of forest management often had built-in lack of time and inconsistency of economic and social framework and terms of forest growth and ripening. We learnt, but not too fast. Forestry often adopted the latest environmental data, but the proposals on environmental management often led to inaccurate or inappropriate conclusions (IUFRO 2014b, f).

According to the speaker, ecology was a historical science, and it was necessary to understand the past influences on a forest before any attempt was made to make sense of the present or future. Newbery offered three options in response to the question of admitting that we did not know enough detail to understand fully what we wanted to manage. One was the conservation approach, which worked well for a small percentage of forests. However, the majority of forests was immediately affected and managed by humans, and so required a different approach. In conclusion, he said: "I am advocating a better recognition of, and hence more attention and thinking about, the role of environmental stochasticity [coloured noise] on forest ecosystem dynamics". (http://blog.iufro2014.com/congress_blog/seeking-a-middle-way-in-ecological-research; IUFRO 2014i, p.21).

On October 8, 2014, the in-Congress tours offered to show the beauty of Utah.

At the third Plenary Session on October 9, 2014, Jack Dangermond and David Haskell (USA)[292] delivered their keynotes on *Knowledge discovery, synthesis, and application at the forest science* and expressed two very different points of view on the world, which caused great interest among the audience and discussion.

[292] Jack Dangermond is the founder and President of ESRI, widely recognized leader in the development and use of Geographic Information Systems (GIS), including ARC/INFO.
David Haskell's book: *The Forest Unseen: A Year's Watch in Nature* was a finalist for the 2013 Pulitzer Prize in non-fiction, received prestigious awards in the United States, and was noticed abroad.

Mr. Jack Dangermond, President, Environmental Systems Research Institute/ESRI, stressed that the planet was evolving and geography as a science played a key role in that evolution. He said: "We live in an age in which we are beginning to measure everything that moves and changes, using GPS[293] and satellites. This technology will become a platform for our evolution because GIS makes science come alive. It is a visual language". He also discussed the Web GIS, new ESRI platform, designed to simplify data exchange and use: "It is fundamentally a new architecture. Traditionally, we put maps into a database. This centralized approach, while powerful, is inflexible." He emphasized the importance of not only imagining how we want the future to unfold, but taking steps to turn imagination into reality (IUFRO 2014g, p.1).

If J. Dangermond concentrated on a more abstract way of ascertaining knowledge, David Haskell, Professor of Biology, University of the South, looked at the world as at a set of components that one could hold in hands. He said that the basic, fundamental reality was not the self, but a network: "Without the network, the individual falls out of existence and the wonder of nature is too often buried away from the general public in scientific papers and technical reports" (ibid., p.1).

IUFRO, USDA Forest Service, Society of American Foresters (SAF) and Canadian Institute of Forestry (CIF/IFC) organized the second part of the plenary session to discuss *Integration and Communication to Bridge the Gap between Science and Management*. The keynote speakers were joined by three panellists: Mila Alvarez[294], Principal of Solutions for Nature[295], Sally Collins, first Director, USDA Office of Environmental Markets[296], Co-Chair, *MegaFlorestais*[297]; and Mike Wingfield, IUFRO President-Elect[298].

The panel was moderated by Nalini Nadkarni, Professor of Biology, University of Utah, who formulated the question for the panel discussion: "How can we effectively integrate the many ways of understanding forests to create the best paradigms to manage them?"

Panellist Sally Collins noted that a good way to start was to slow down a bit and be more deliberate, because racing through urgent things all the time, we were missing much in the essence of the process. She believed that understanding of our life might lead to a better understanding of the world and said: "If we don't know what we don't know, we will continue not to know it" (IUFRO 2014g, p.2).

Professor Mike Wingfield agreed that we should slow down and think, and added that, at the same time, we should deal with the real world.

Professor Mila Alvarez spoke about the importance of time and its perception as a continuous variable with its influence on the processes of natural resource management and said: "However, there are forest ecosystems that have been around for thousands of years. As managers we are cognizant of that timeframe, but society lives in the present" (ibid., p.2).

Jack Dangermond remarked: "We live in stimulus/response world and a

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[293] GPS: Global Positioning System.

[294] She is also a Professor at Virginia Polytechnic Institute and State University, USA, Centre for Leadership in Global Sustainability, College of Natural Resources.

[295] *Solutions for Nature* is a consulting firm, specializing in research and analysis in the fields of domestic and international natural resources policy, management, and decision-making; an organization, established to informally connect top forest leaders in the world.

[296] She is also the President of the SallyCollins LLC consulting firm, engaged in international forestry and ecosystem services valuation (Lyons, Colorado, USA).

[297] *MegaFlorestais* is an informal network of heads of forestry agencies of the largest forested countries in the world, designated to advance international dialogue and exchange on transitions in forest governance, forest industry, and roles of public forest agencies.

[298] He is also the Founding Director of the Forestry and Agricultural Biotechnology Institute (FABI) in South Africa.

contemplative/creative world. We are integrative in our own sense of being able to deal with the abstract world and the contemplative/ordinary world." (IUFRO 2014b, g, p.2).

Haskell proceeded, saying: "Storytelling was a mechanism that encourages conversation and listening across big divides. Branching out into areas that are not directly in line with one's profession helps to bridge gaps as well". The panel also discussed the place of ethics, especially as it related to sharing, or not sharing, data and even how those data were displayed. Recognizing the power of knowledge, Dangermond noted that the world seemed to be moving toward a more open sharing of data through the power of the Internet (IUFRO 2014i, p.22).

A good way to sum up the discussion was to cite Sally Collins, who said, "How you take science and incorporate it into management is an art form. The best science in the world goes nowhere if you don't have infrastructure to implement it and an adequate budget. The science culture and the management culture have to meet." (IUFRO 2014 g, p.2).

On October 10, 2014, Dr. Carol J. Pierce Colfer[299] made her keynote presentation, called *The people and forests trajectory – 1994-2014 and beyond*, raising a question about the progress in better understanding of the anthropogenic impact on forests and forests on people during the last 20 years.

The forest world witnessed considerable progress in the forest and people relationship. Special attention was paid to human welfare studies and traditional knowledge on forest, to attempts of working with the communities and to relations with power (empowerment, ethnic and gender studies), etc. It was noted that the more controversial topics should be considered in research such as slash-and-burn (shifting cultivation) land use, food, human health and human rights. Often, the role of the female was almost invisible in the forest community, and it was difficult to integrate gender issues in forest research. However, she pointed out that the results were less than favourable: Forests remained in decline, human well-being had hardly improved, and benefits continued to be inequitably distributed (IUFRO 2014i, p.23).

The speaker also said that to enhance human capabilities, there was a need in a better understanding of the relationship between men and women, the interaction between them and the forest, and that it required courage to address: (a) sensitive issues of division of labour in households, religious beliefs and related ideals, as well as all sorts of violence against women; and (b) methodologically complex values, norms and other intangible cultural issues. The measure of success would be effective integration of many disciplines related to the expansion of our understanding of forests and human communication. In conclusion, talking about sustainability, she mentioned that, there was still much work to do, and we had to think about how we cold integrate this information into ongoing forest management (IUFRO 2014b, g,i).

On October 11, 2014, the keynote speech of Dr. Cecil Konijnendijk van den Bosch[300] covered the theme: *City forests, forest cities – exploring the complex liaison between the sylvan and the urban his keynote speech;* the speaker analysed the current relationship between forest and city, based on historical insights and present policies, initiatives, and projects from across the globe. He emphasized the role of research in strengthening ties between urban and sylvan. With the growth of the first cities, the relationship between the forest (Sylvan) and city (Urban) had become complex. Cities and forests often had hostile or at least confronting relationships as man-made and natural conditions. On the other hand, the cities were largely dependent on their internal development and on the forests. Some cities had developed as a true "forest city", integrating trees and forests in their

[299] Senior Associate at the Centre for International Forestry Research (CIFOR) and a Visiting Scholar at Cornell University's Southeast Asia Program in Ithaca, New York.
[300] Head of the Department of Landscape Architecture, Planning and Management at the Swedish University of Agricultural Sciences (SLU).

body and mentality. In recent years, a noticeable growth of "green thinking" about the infrastructure, and a provision of a number of forest ecosystem services were taken into account. Difficulties in assessing the cultural services provided by forest ecosystems to the city hindered the development of urban-forest relations. At the same time, forests and trees in urban environments provided a wide range of cultural services that promoted health, well-being and quality of life of citizens. It is worthwhile to quote one of the thoughts of speaker: "Trees can even help us reach self-actualization, the top level of Maslow's hierarchy of needs" (IUFRO 2014b, h; IUFRO 2014i, p.23).

Most of the papers set the direction and tone of the Congress, were focused on problems of global scale and emphasized concerns of the scientific community about the forestry situation in the world (IUFRO 2014a, b, i). The Congress agenda thematically was based on the seven areas (see below), overviewed at the 19 sub-plenary sessions and discussed at 168 technical and three special sessions. These thematic areas are as follows (IUFRO 2014i, pp.26-27):

"*Forests for People*. Forests, woodlands, and agroforests play a vital role in the lives of people in both rural and urban communities, supporting livelihoods, food and energy security, human health and well-being, and culture. This theme, which focused on social, cultural, and economic aspects of the management and use of forest resources, included a broad set of topics such as: human health and well-being, urban forestry, small-scale and community forest management, rural development, nature-based recreation and tourism, landscape planning and management, conservation and forest ethics, forest history, traditional knowledge and culture, forest policy, governance and tenure issues, communications, and education.

"*Forest Biodiversity and Ecosystem Services*. The conservation and sustainable use of forest biodiversity is essential for maintaining the full range of environmental, economic, social, and cultural goods and services provided by forests. Sessions within this Theme considered such topics as the role of biodiversity in the provision of ecosystem services; the effects of deforestation, forest degradation, natural disturbances, and human management activities on forest ecosystems, habitats, and species and provision of ecosystem services at different spatial and temporal scales; assessment and valuation of forest ecosystem services; strategies for forest biodiversity conservation and restoration; and challenges in achieving a balance between biodiversity conservation and management of forests for a variety of ecosystem services.

"*Forests and Climate Change*. Understanding and anticipating the impacts of climate change on forest ecosystems and the services they provide to people are critical to efforts to develop and implement effective policies and management strategies for climate change mitigation and adaptation. Sessions within this theme considered climate change effects on forest ecosystem structure and function; interactions with other natural disturbances and forest management regimes; land-use and land cover change; monitoring and modelling of forest conditions, biomass, carbon and climate change – related impacts on forest ecosystems, landscapes, and communities; and environmental, social, and economic implications of forest-based climate change adaptation strategies and mitigation opportunities (such as REDD+).

"*Forest and Water Interactions*. An understanding of the linkages between forests and forested wetlands and hydrological processes is essential for managing ecosystems at watershed or landscape scales to sustain the availability and quality of water resources critical for human well-being. Sessions within this theme examined the influence of land cover and land use, large-scale natural and human-induced disturbance (including climate change), and forest management on watershed hydrology, biodiversity, and provision of water-related ecosystem services, as well as the latest findings from long-term watershed research, studies of mangrove and riparian forests, and adaptation of trees and forests to drought.

"*Forest Biomass and Bioenergy*. The rapidly growing use of wood and biomass sources for bioenergy, biofuels, and bio-based products requires the development of innovative production systems; more efficient use of material from plantations based on end-user, raw material, and processing requirements; and management of competition for biomass from planted and natural forests for energy versus other forest products and environmental services. Sessions within this theme explored these issues as well as current research on genomics, biotechnology, and breeding and selection of trees to meet changing biomass and bioenergy objectives; and life-cycle analyses and "eco-efficiency" of forest bioenergy production systems and technologies.

"*Forests and Forest Products for a Greener Future*. The future of forest management in the face of forest loss and ever-increasing demands for food, timber and wood fibre, water, and other ecosystem services, and uncertainties posed by globalization and economic, social, and environmental uncertainty, is a fundamental challenge for the forest sector and the forest research community alike. Innovation, including development of economically and socially sustainable and environmentally responsible production systems and end-products, will play an important role to meet these challenges. Sessions within this theme explored these issues as well as forest sector trends, new research developments in forest operations, forest management, innovations in wood-based and non-wood forest product development, and forest certification.

"*Forest Health in a Changing World*. Healthy forests are foundational to the delivery of ecosystem goods and services, yet these benefits are under threat from sources ranging from climate change to globalization. Sessions within this theme focused on trends in hazard occurrence (air pollution, responses to climate change, invasive-species introduction, fire, and global trade pathways); vulnerability of forests (tree resistance, shifts in pest and host species relationships, and forest resilience); society and forest health (socioeconomic impacts associ-ated with forest health); mechanisms of risk mitigation (pest- management solutions, alterna-tive forest-management strategies, modelling); and global trade issues (surveillance strategies, forest pest incursion management, and phytosanitary protection)" (IUFRO 2014i, pp.26-27).

The below themes of the sub-plenary sessions can give a general idea of the complexity of the Congress:

- SP-01 Forest Foods, Medicines, and Human Health
- SP-02 Integrating the Economics of Ecosystem Services into Sustainable Forest Management
- SP-03 Forest Health in a Changing World
- SP-04 The IUFRO Directors' Forum: Crossing Science Boundaries for the Benefit of Forests and People
- SP-05 Biodiversity and Ecosystem Services in Planted Forests
- SP-06 Cultural Values, Quality of Life, and Forest Landscapes
- SP-07 The Importance of Quantifying Uncertainty in Managing Forests
- SP-08 The Future of Our Forests
- SP-09 Forests for People: Ecosystem Services under Pressure?
- SP-10 Resilience of Forest Ecosystem Services to Changing Disturbance Regimes
- SP-11 Advances in Large-Scale Forest Inventories to Support the Monitoring and the Assessment of Forest Biodiversity and Ecosystem Services
- SP-12 Policy Learning for Multilevel Governance
- SP-13 Forest Biodiversity, Ecosystem Services, and Human Well-being – Harnessing Biodiversity for Adaptation to Global Change
- SP-14 Energy from Trees: Technology, Opportunities, and Challenges
- SP-15 Historical Responses of Research to Global Forestry Issues

- SP-16 Triumphs, Tribulations, and Transitions – The Graduate Research Experience from the Student IUFRO Award Winners
- SP-17 Forests, Water, and People
- SP-18 Stemming Invasions of Forest Insects and Pathogens: Research Supporting Pathway Risk Management and Phytosanitary Policy
- SP-19 IUFRO Strategy 2015-2019 – Research Excellence and Information for the Benefit of Forests and People.

It is impossible to cover even briefly all sub-plenary sessions, but some of them, in our opinion, deserve to be mentioned.

The traditional IUFRO Directors' Forum was held as a sub-plenary session (SP-04 *The IUFRO Directors' Forum: Crossing Science Boundaries for the Benefit of Forests and People*). This Forum was organized by Konstantin von Teuffel (Director, Baden-Württemberg Forest Research Institute – FVA, Germany), Peter Mayer (Director, Austrian Research Centre for Forests – BFW), and Jimmy Reaves (Deputy Chief for R&D, U.S. Forest Service). It brought together heads of forest research institutes and deans of the university forest faculties, and provided a platform for exchange and development of views on forest research management.

The research landscape and political agenda are becoming increasingly fragmented. Many forest studies are concentrated in institutions, working at broader thematic issues. The Director's Forum discussed how to keep the relevance of forestry research in the coming decades.

The discussion was initiated by Jimmy Reaves, who presented the results of a survey of heads of IUFRO member organizations in preparation for the Directors' Forum. The results of the survey reflected the expanded scope of forest research institutions from a focus on forest research to broader interests in research priorities such as climate change, landscape, water, and social issues. Björn Hånell, Coordinator, Division 1 *Silviculture* and incoming Vice-President for Divisions, gave a brief overview of major research challenges from the IUFRO perspective, putting major societal developments in relation with the five new themes guiding the IUFRO Strategy 2015-2019. He emphasized that the faced challenges were far bigger than current forest research management could overcome. Thus, the Strategy challenged IUFRO Divisions to work across disciplinary boundaries (IUFRO 2014i, p.28).

During the discussion, a panel of distinguished speakers shared their points of view: Ann Bartuska, Deputy Undersecretary for USDA's Research, Education, and Economics Mission Area, was talking about social issues, related to forests and trees; Martin Apple, President Emeritus, President, Council of Scientific Society, talked about the interdisciplinary approach; Leena Paavilainen, Acting Director, Finnish Forest Research Institute (METLA) talked about the experience she had gained as the Head of the Institute; and, finally, Tony Simons, Director General, World Agroforestry Centre (ICRAF), focused on the need for more social science and interdisciplinary research to attract funding.

It is worth to mention an interesting discussion during SP-15: *Historical Responses of Research to Global Forestry Issues* where the four (past, current and newly elected) IUFRO Presidents participated. Jürgen Blaser (Bern University of Applied Sciences, Switzerland) presented the main paper, describing challenges faced by forestry over the last 25 years, as seen by the three lead foresters who had been deeply involved in international forestry policy-making for many years. His co-authors were Hans Gregersen (University of Minnesota, St. Paul, USA) and Hosny El-Lakany (University of British Columbia, Canada).

They assumed that the overarching challenge was to meet increasing needs for forest goods and ecosystem services in a more efficient, effective, and sustainable manner. So, they identified

three strategic challenges: to reduce the loss of existing natural forests; create new productive planted forests, including restoration of degraded lands; and improve the efficiency and effectiveness of management, processing, and use of both natural and planted forests and trees outside forests.

Salleh Mohd.Nor (President in 1991-1995) stressed the special situation, needs, and IUFRO activities of developing countries. Lack of political support, financial support, and human resources were barriers to effective research, and IUFRO launched its Special Programme for Developing Countries and the Asia Pacific Association of Forestry Institutions.

Jeff Burley (President in 1996-2000) looked at the period as a time of consolidation and innovation to take IUFRO into the new century. The major elements included interdisciplinary approaches to problem solving with increasing multidisciplinary meetings and projects together with the creation of task forces to address specific policy problems; adoption of modern information technology for dissemination of research results; and publication of books, brochures and leaflets, including guidelines for action on major topics.

In the period of Risto Seppala (President in 2001-2005), IUFRO sought to open itself up and to make itself useful, attractive, visible, and credible. In particular, it established agreements and collaboration with several international agencies. To do this, it was necessary to increase its visibility through its logo, its flag, new publications, attractive annual reports, electronic newsletters and representation at meetings of the major agencies.

The period of Don Koo Lee (President 2006-2010) recognized the continuing lack of resources and expertise, especially in developing countries. It also identified the lack of attention to traditional knowledge sources and actions. The Union played significant roles in the UNFCCC and UNCBD. In response to a question from the audience, the past Presidents variously felt they would have liked to have further encouraged women in forestry, sought support for forestry research in Africa, and spent more effort on direct support of research with less on reorganization of internal structures. Another questioner requested short messages for future scientists and IUFRO. Those included “Partner or perish”; “Specialise but be open to other disciplines”; “Learn from the (sometimes distant) past”; and “Double the size of IUFRO.” (IUFRO 2014i, pp. 33-34).

Another interesting discussion developed at SP-16: *Triumphs, Tribulations, and Transitions – The Graduate Research Experience from the Student IUFRO Award Winners.* In this Sub-Plenary Session, IUFRO Awards for Graduate and PhD students were presented. Shirong Liu, Chair, IUFRO Honours and Awards Committee, explained that the IUFRO Student Award for Excellence in Forest Sciences (ISA) and the Outstanding Doctoral Research Award (ODRA) recognized outstanding individual scientific achievements during the university studies or within 3 years after graduation or recognized outstanding individual scientific achievements of recent Doctoral research. Recipients of the IUFRO ODRAs and IUFRO ISAs participated in the panel discussion about personal and intellectual triumphs and tribulations, encountered while conducting their winning research projects. The session was designed as an informative meeting for existing and prospective graduate students, and its participants answered a series of prepared and audience-directed questions (IUFRO 2014h, p.2; IUFRO 2014i, p.34).

It should be mentioned that the recipients of IUFRO ODRA had completed their doctoral dissertations mostly in the USA within the past six years. The IUFRO ODRA recipients were:

- Dr. Jan R. Bannister Hepp, Germany/Chile, Institute for Silviculture at Freiburg University – for his doctoral research about the dynamics and restoration of *Pilgerodendron uviferum* forests on Chiloé Island in North Patagonia;
- Dr. Susana Barreiro, Portugal, University of Lisboa, School of Agriculture, Forest Research Centre – for her substantial contributions to the development of large-scale simulations models;

- Dr. ShuaiFei Chen, China/South Africa, Forestry and Agricultural Biotechnology Institute (FABI) at the University of Pretoria – for his most extensive study of fungal pathogens of eucalypts in China to date;
- Dr. Puneet Dwivedi, India/USA, University of Georgia – for his integrative approach to ensure sustainable management of forest resources worldwide and utilization of wood-based bio-energy products for mitigating carbon emissions in the United States;
- Dr. Zhun Mao, China/France, Institut national de recherche en sciences et technologies (IRSTEA) – for his research on using forest vegetation to improve slope stability, meta-analysis of root reinforcement, and the development of modelling approaches;
- Dr. César Pérez Cruzado, Spain/Germany, University of Göttingen – for his experiments and models developed to enable policymakers and landowners to make management decisions in terms of forest plantations established over former agricultural land, with carbon sequestrations as an objective;
- Dr. Sandra Rodríguez Piñeros, Mexico/USA, Oklahoma State University – for her thesis "The role of analysis and deliberation in changing community preferences for strategies and indicators of sustainable forest management", which addresses the major challenge in the implementation of sustainable forest management plans in developing countries;
- Dr. Eli Sagor, USA, University of Minnesota – for his dissertation "Personal networks and private forestry: exploring extension's role in landowner education" – a transformative work that provides ground-breaking empirical research to guide new extension investments throughout the United States;
- Dr. Huei-Shing Sik, Malaysia, Forest Research Institute Malaysia (FRIM) – for developing a two-in-one method for rubber-wood processing, via drying-cum-high temperature treatment for accelerated throughput of environmentally friendly rubber-wood furniture dimension stocks (IUFRO News 2014a, pp. 5-7).

The recipients of IUFRO ISA were:

- Julius Adewopo, United States/Nigeria made outstanding contributions to research and leadership in wood utilization and in forestry. His MSc thesis had critical relevance to the wood industry because it filled a much needed information gap about the effect of heat treatment on six different mechanical properties of wood;
- Tolulope Daramola, United States/Nigeria wrote his MSc thesis on the Assessment of nitrogen fertilization on growth yield and carbon storage in above ground biomass of a managed Douglas fir forest stand in the Pacific Northwest and the application in the sub-Saharan Africa. He served as President of IFSA, a member of the Governing Council of the CFA, and became a member of the UNFF Major Groups as a representative from the Youth Major Group;
- Md. Mohitul Hossain, Bangladesh, had been involved in forestry research since his undergraduate program, and had already published his previous Master thesis on *Soil erosion under different plantations in CHTs, Bangladesh*, as a book and his Bachelor thesis in an international journal;
- Sharif Ahmed Mukul, Bangladesh was an outstanding Masters graduate, undertaking a PhD at the University of Queensland, Australia. He obtained a triple MSc in Agricultural Development from the University of Copenhagen, in Tropical Forestry and Management from the Technical University Dresden, Germany and in Forestry from Shahjalal University of Science and Technology in Bangladesh. Mr. Mukul's thesis dealt with changes in swidden cultivation practices amongst an ethnic minority group in central Nepal;
- Mika Yoshida, Japan, successfully analysed the appropriate chipping site of logging residues for her bachelor degree, and succeeded in calculating the limit of transportation distance when

using the terminal landing. The focus of Ms. Yoshida's work as an MSc student was to improve the efficiency of forest biomass feedstock supply through cost reduction and improved logistics on harvesting, chipping and transportation;

– Ivana Zivojinovic, a Serbian national based in Austria, obtained her engineer's degree at the Faculty of Forestry in Belgrade at the department of Landscape Architecture and Horticulture. In 2013, she received a double MSc in European Forestry from the University of Natural Resources and Life Sciences in Vienna and the University of Eastern Finland in Joensuu (IUFRO News 2014a, pp. 7-8).

One more Sub-Plenary Session was entirely dedicated to the discussion of the IUFRO Strategy. SP-19: *IUFRO Strategy 2015-2019 – Research Excellence and Information for the Benefit of Forests and People* was organized by Niels Elers Koch, outgoing IUFRO President, and Mike Wingfield, incoming IUFRO President. "A lively debate arose from the brief presentations of the incoming Division Coordinators. Overall, the Division leadership displayed a clear and deep commitment to executing the key elements of the new IUFRO strategy. Most Divisions had already planned inter- and, in some cases, intra-divisional activities for the coming five-year board term. In addition to these, they saw substantial opportunity to develop inter-divisional meetings as part of the various larger meetings during the 2015-2019 board term (i.e., FAO World Congress, IUFRO 125th Anniversary Meeting, Regional Meeting planned for Southeast Asia)" (IUFRO 2014i, p. 35).

The President's Discussion became a valuable feature of the IUFRO World Congress. The topic was usually selected by the IUFRO President. At the 2014 Congress, the focus was on *Emerging Issues in Forest Policy and Practice: Input from Stakeholders to the Science Community*. IUFRO President Niels Koch, as the moderator, initiated the panel discussion and invited Jürgen Blaser (Global Adviser on Forests to the Swiss Agency for Development and Cooperation), Tukka Castrén (Acting Forestry Advisor, the World Bank), Teresa Magro (Professor for Protected Areas Management, University of São Paulo), T. Bently Wigley (Vice-President, Forestry Programs, National Council for Air and Stream Improvement, USA), Steven Johnson (Assistant Director for Trade and Industry, ITTO), and Yemi Adeyeye (Liaison Officer to FAO, IFSA).

Mr. Robert Bonnie made a keynote presentation, highlighting the complexity of emerging issues, including forest restoration and increasing demand for forest goods and services. He underlined that scientific community played an important role in awareness raising on related discussions and mediating them as well as the role of markets, underlying that forests should deliver some values to people who owned and managed them, and lived around them.

Jürgen Blaser listed the four crucial global challenges: the need for forests to provide material for the world's growing population; climate change; the loss of ecosystem services; and occurrence of extreme events; and said that these global challenges required new approaches, including landscape restoration based on more cohesive governance provisions across sectors and land uses.

During the discussion, Tuukka Castrén focused on poverty reduction; Teresa Magro talked about main research issues, relating to tourism and recreation and their effects on protected areas; Steven Johnson reminded about the value of outputs from already conducted research which had not yet been implemented, although, the research was just as valuable as new research; Yemi Adeyeye identified the need to encourage youth to enter the forest sector and overcome obstacles such as lack of economic incentives, education, and awareness of jobs within the forest sector. Their shared conclusion was: "In all activities, forest research must not only ask the right questions, but it also needs to point at solutions. In doing so, communication with policy makers, stakeholders, and the public is crucial. Innovative ways and means of communication will be pivotal not only for reaching out to youth but also to widely share forest research and to raise awareness about forests and forestry from a policy and practice perspective" (IUFRO 2014i, p.94-95).

Traditionally operated, the Congress Scientist Assistance Program (CSAP) for developing countries and countries in transition supported about 20% of delegates from these countries, or 122 individuals, including 60 women and 62 men. The IUFRO Special Programme for Development of Capacities (SPDC), successor to the IUFRO Special Programme for Developing Countries (SPDC), held two training workshops prior to the Congress (September 29 - October 2, 2014) for a group of 69 young professionals from developing countries on modern methods of research and communication in forest science (IUFRO 2014d). Seventy one participants from 32 countries in Africa, Asia and Latin America were selected from 341 applicants for both training and sponsorship under the CSAP. Other 51 participants were selected by the Congress Organizing Committee to be supported by the USDA and from the Congress budget. The participants could also attend a one-day workshop on *Introduction to the Global Forest Information Service (GFIS)*, led by the GFIS Team (IUFRO 2014i, p.111-114).

[IUFRO Special Programme for Development of Capacities (SPDC) Training Workshop, 2014]

The Congress was coupled with an impressive Trade Exposition which presented the best examples of tools, machinery, technology, scientific publications and other products of forest industry, exhibited by 127 different organizations.

Organizational matters

During this Congress, several meetings of the IUFRO Enlarged Board (EB), Management Committee (MC), International Council (IC), nine Divisions and Working Parties (WP), Research Groups (RG), and Task Forces (TF) were held.

At its two meetings, the IUFRO International Council discussed a number of matters of major significance for IUFRO and adopted respective decisions; those included:

1. Thorough discussion of the new IUFRO Strategy for 2015-2019;
2. Selection (through voting) of the host country of the 25th IUFRO World Congress:

Curitiba, Brazil, 2019;

3. Revision and approval of the Salt Lake City Congress Declaration 2014;
4. Election of the new President, Vice Presidents and Voting Members of the IUFRO Board for the next term:

- New President – Michael Wingfield (2014-2019), Director, Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, South Africa;
- Vice President responsible for Divisions – Björn Hånell (Sweden);
- Vice-President responsible for Task Forces, Special Programmes, Projects and IUFRO-Led Initiatives – John Parrotta (USA);
- Immediate Past President – Niels Elers Koch (Denmark);
- Division Coordinators: D1. – Jens Peter Skovsgaard (Sweden), D2. –Yousry El-Kassaby (Canada), D3. – Woodam Chung (USA), D4. – Jean-Luc Peyron (France), D5. – Pekka Saranpää (Finland), D6. – Tuija Sievänen (Finland), D7. – Eckehard Brockerhoff (New Zealand), D8. – Jean-Michel Carnus (France), and D9. – Daniela Kleinschmit (Germany);
- President's Nominees: Shirong Liu (China), John Innes (Canada), Ben Chikamai (Kenya), Jung-Hwan Park (Republic of Korea), and Manuel Guariguata (Venezuela);
- Executive Director – Alexander Buck (Austria);
- FAO Representative – Eduardo Rojas-Briales (Italy);
- Special Programme for Development of Capacities (SPDC) – Michael Kleine, (Austria);
- Global Forest Information Service (GFIS) – Eero Mikkola (Finland);
- Special Project: WFSE (World Forest, Society and Environment) – Pia Katila (Finland);
- Global Forest Expert Panel (GFEP) – Christoph Wildburger (Austria).

Professor Don Koo Lee (Republic of Korea), Immediate Past President was awarded IUFRO's Honorary Membership for his outstanding and valuable service to IUFRO. Professor Lee was "the second Asian to serve as President of IUFRO and served for 19 years in several leading offices in IUFRO's governing bodies. Lee has also played an important role in Seoul National University (SNU) and in the Korea Forest Service" (IUFRO 2014i, p.101).

The Distinguished Service Awards (DSA) were presented during business sessions to Santiago Barros Asenjo (Chile) and Peter Herbst (Austria) whose work had substantially contributed to furthering the scientific, technical, and organizational aims of IUFRO. "An additional DSA was given during the Closing Ceremony to Richard W. Guldin of the United States of America for outstanding contributions to IUFRO as Working Party Leader in Division 6, creator and leader of the Task Force on the Forest Science-Policy Interface, and since 2010 as the Chair of the Congress Organizing Committee" (ibid., p.101).

It should be mentioned that the DSA was also granted to Perry Brown (University of Montana, USA) and Dave Cown (Scion, New Zealand) in 2011, to Joseph R. Cobbinah (Forestry Research Institute of Ghana – FORIG, Ghana) in 2012 and to Gerardo Mery (IUFRO-WFSE, Chile/Finland) in 2014.

The IUFRO Best Poster Award (BPA) was meant to encourage public dissemination of high-quality research and to recognize distinguished poster presentations by young scientists. The BPA was given to each Division. In 2014, the BPA was won by:

- D1: Emma Soraya (Australia, Australian National University) – D4-151: Improving the productivity of native eucalypt forests;
- D2: Chai Ting Lee (Malaysia, Forest Research Institute Malaysia) – D2-008: Discovery of genic microsatellite markers from transcriptome sequences of Eurycoma longifolia root;
- D3: Lilli Kaarakka (Finland, University of Helsinki) – D1-089: Effects of repeated whole-tree

harvesting on soil properties and tree growth in a Norway spruce stand;
- D4: Nyein Chan (Japan, Kyoto University) – D4-141: Assessment of aboveground biomass and soil carbon storage of the fallow forests after swidden cultivation in the Bago Mountains, Myanmar;
- D5: Min-Jay Chung (China-Taipei, National Taiwan University) – D5-071: Profiling of aroma compounds released from four major bamboo shoots of high economic value in Taiwan;
- D6: Emmanuel Danquah (Ghana, Kwame Nkrumah University of Science and Technology) – D6-045: Exploring opportunities for participatory management at Bia Biosphere Reserve in western Ghana;
- D7: Tsutomu Kanasashi (Japan, Nagoya University) – D8-055: Seasonal change of cesium in different age needles and male flowers of Japanese cedar (*Cryptomeria japonica*) in Fukushima;
- D8: Althea A. Arch Miller (USA, Auburn University) – D2-022: Temporal and spatial variability of soil carbon flux in longleaf pine forests in the south-eastern United States;
- D9: Olivia Sanchez Badini (Canada, University of British Columbia) – D6-042: Small and medium forest enterprises in a REDD+ context: an analysis of enabling environments in developing countries (IUFRO 2014h, p.3; IUFRO 2014i, p.103).

In the afternoon of Saturday, October 11, 2014, the Congress Closing Ceremony began with acknowledgement of the officers and staff of the Congress Organizing Committee, session organizers, moderators, speakers, poster presenters and other people who had contributed to the success of the 24th IUFRO World Congress. Then, the IUFRO ODRA, ISA, and BPA winners, IUFRO DSA and Honorary Membership Award were granted to the distinguished persons; the decisions of the International Council were shared with the delegates; and the new IUFRO Board for 2014-2019 was introduced.

Mike Wingfield, incoming President, delivered his inaugural address, highlighting the IUFRO history and setting his goals as IUFRO President for next five years.

Niels Elers Koch, outgoing President, delivered his final address and gave three wishes to the delegates to have the same excellent opportunities and experiences that he had had through IUFRO; to use the Congress to share knowledge with others, so that all attending could benefit; and finally, to commit to getting involved in IUFRO, as it was the great strength of IUFRO to have committed members (IUFRO 2014i, p.18).

After this, Niels Elers Koch, Richard Guldin, and Ann Bartuska lowered the IUFRO flag. Interestingly, Ann Bartuska (USFS) received the IUFRO flag from IUFRO President Don Koo Lee at the end of the Seoul Congress in 2010. “So she was invited to participate in this final act of the 2014 Congress and help deliver the flag to the 2019 IUFRO World Congress Organizing Committee members Joberto Veloso de Freitas of the Brazilian Forest Service and Yeda Maria Malheiros de Oliveira of EMBRAPA Forestry” (IUFRO 2014i, p.19). Edson Tadeu Iede, Director, EMBRAPA Forestry, and Marcus Alves, Director General, Brazilian Forest Service, spoke about this opportunity for Brazil to highlight its policies and programs, opportunities and challenges.

Finally, Niels Elers Koch and Mike Wingfield thanked Richard Guldin for his service as the Chair of the Congress and officially closed the 24th IUFRO World Congress.

Resolutions

The 24th IUFRO World Congress adopted its Resolution, and the Board endorsed the IUFRO Strategy for 2015-2019.

The Salt Lake City Declaration
Sustaining Forests, Sustaining People: The Role of Research

Forests and trees play a critical role in supporting the livelihoods and quality of life of people worldwide, providing income opportunities, sustaining agricultural productivity, food security and nutrition, providing adequate supplies of clean water, affordable and sustainable sources of renewable energy, and forest-based products. Forests and trees also hold the key to our future well-being, improving the environmental quality of growing urban centres, contributing to the mitigation of, and adaptation to, climate change, and the conservation of our planet's biodiversity upon which our survival will ultimately depend.

The 24th World Congress of the International Union of Forest Research Organizations (IUFRO) "Sustaining Forests, Sustaining People: The Role of Research" brought together 2,500 scientists from more than 100 countries, and 1,300 professional foresters from North America. It provided a unique forum for presentation and discussion of current and future global research needs in forest science. The Congress explored the role of science in crafting practical measures to enhance the resilience of forests and their capacity to provide the environmental, economic, social, cultural, spiritual, and health benefits that sustain rural and urban societies worldwide.

Based on this World Congress, IUFRO commits itself to expand and intensify its efforts to develop and promote integrated solutions to the interrelated economic, social and environmental challenges we must face together. These efforts will also inform the discussions that will take place next year at the XIV World Forestry Congress 2015 and other important gatherings, including the United Nations Forum on Forests, which will promote ongoing efforts toward achieving a coherent and integrated development agenda beyond 2015.

Pursuing these goals will require effective collaboration among people across landscapes, sectors, and disciplines. During the next five years, IUFRO is committed to building on the strengths of its current global network. In particular, IUFRO will expand its interdisciplinary research and partnerships with scientists in related fields, and broaden its dialogue with, and service to, other organizations, communities, land managers, and policy makers.

The need for international cooperation in forest research and the dissemination of research findings has never been greater. As the global network for forest science, IUFRO shall do its utmost to meet this need (IUFRO 2014i, p.12).

IUFRO Strategy for 2015-2019

On October 11, 2014, the IUFRO Board endorsed the new Strategy at its joint meeting of outgoing and incoming members. "This strategy builds on three interrelated preparatory activities: (i) a review of progress made in implementing the previous IUFRO Strategy 2010-2014, (ii) an online survey carried out among the heads of IUFRO Member Organizations and officeholders, and (iii) the recommendations of an independent Review Panel[301]. (…) With this Strategy, IUFRO will continue to promote global cooperation in forest-related research and to enhance the understanding of ecological, economic and social aspects of forests and trees. By engaging its global network and collaborating with scientists in related and fringe disciplines, IUFRO will be a global convener, bringing people together to address the complex natural resource challenges facing the planet and its people – in other words: interconnecting forests, science and people" (IUFRO Strategy 2015, p.3).

Compared with the previous Strategy, the new one includes not only the Mission and Vision, but also Core Values: Service; Independence; Integrity; Excellence; Networking to guide the work

[301] The Panel conducted its work from November 2012 and May 2013.

of IUFRO's officeholders together with the associated behaviours (ibid., p.11).

Discussed at the Congress and endorsed by the Board, the IUFRO Strategy for 2015-2019 with its overarching theme of *Interconnecting forests, science and people* identifies five scientific themes in the most important areas and three institutional goals of the Union's development.

The IUFRO Strategy 2015-2019
Interconnecting forests, science and people
Executive Summary

The International Union of Forest Research Organizations (IUFRO) is the leading global network for forest science cooperation. It is the only worldwide international organization devoted to forest research and related sciences. Our unique membership brings together research organizations, universities and individual scientists, as well as decision-making authorities and other stakeholders with an interest in and focus on forests and trees.

IUFRO's mission is to advance research excellence and knowledge sharing, and to foster the development of science-based solutions to forest-related challenges for the benefit of forests and people worldwide.

With the Strategy 2015-2019, IUFRO addresses five research themes and associated emphasis areas, and three institutional goals. The following five themes aim to guide the science collaboration within IUFRO's global network in the forthcoming period:

1 Forests for People

2 Forests and Climate Change

3 Forests and Forest-based Products for a Greener Future

4 Biodiversity, Ecosystem Services and Biological Invasions

5 Forest, Soil and Water Interactions

The three institutional goals adapted from the previous strategy present IUFRO's commitment to research excellence and interdisciplinary cooperation, to better visibility of IUFRO's knowledge products and network cooperation, and to science-based solutions and options for influencing policy processes.

Goal 1 Research Excellence: Strive for quality, relevance and synergies

Goal 2 Network Cooperation: Increase communication, visibility and outreach

Goal 3 Policy Impact: Provide analysis, insights and options

Attaining both thematic and institutional goals should help IUFRO and its members to effectively respond to the changes in paradigms concerning forests and forest science, and should help IUFRO to position itself even more strongly as the leading global network for forest-related research" (ibid., p.5).

Each theme has a Problem Statement, Justification and Emphasis Areas.

The Emphasis Areas for each Theme are listed below:

Theme 1: Forests for People. Emphasis Areas:

1. Forests for livelihood
2. Forests for quality of life
3. Social values of forests
4. Forest governance

Theme 2: Forests and Climate Change. Emphasis Areas:

1. Impacts of climate change on forest ecosystems and forest-dependent people
2. Feedbacks between climate, land cover, forest disturbance and provision of energy and water
3. Biodiversity and invasive species
4. Mitigation and adaptation strategies

Theme 3: Forests and Forest-Based Products for a Greener Future. Emphasis Areas:

1. New forest-based products and services
2. Use of forest resources and raw materials

3. Valuing forests and their ecosystem services

Theme 4: Biodiversity, Ecosystem Services and Biological Invasions. Emphasis Areas:

1. Trends, causes and impacts of biodiversity loss at all levels
2. Landscape-level strategies for biodiversity conservation and sustainable use
3. Ecosystem services
4. Contribution of restoration to the conservation and sustainable use of biodiversity and ecosystem services
5. Biological invasions threatening biodiversity and ecosystem services of forests

Theme 5: Forests, Soil and Water Interactions. Emphasis Areas:

1. Macro-level land management and impacts on the water cycle
2. Climate change adaption and mitigation, and interactions with water yield and quality, nutrients and soil resources
3. Forest ecosystems and water conservation
4. Forest ecosystems and disaster prevention and reduction".

In the framework of our vision and mission, IUFRO has oriented its instructional strengths and capacities towards three institutional goals which highlight research excellence, network cooperation and policy impact.

The institutional goals, objectives and related actions build on past achievements, and aim to further sharpen the strategic orientation of IUFRO by focusing on areas in which we want to perform better or where we see a need to be more active in the next five years (IUFRO Strategy 2015, p.23). Fundraising was deemed to be a cross-cutting issue, e.g., an end in itself.

Excursions

The Congress organizers offered a fairly extensive tour program, including: 3 pre-Congress multi-day tours (out of the 9 originally offered tours), 27 (including lettered) in-Congress tours on October 8, 2014, and 3 post-Congress tours. Many local sightseeing tours were organized for accompanying persons (IUFRO 2014i).

Three pre-Congress tours were organized: (i) Northern California: Red Wine to Redwoods (3 days, 9 participants); (ii) Ecology and Biogeography of the Wasatch and Uinta Mountains (3 days, 13 participants); and (iii) Sustaining Diverse Ecosystems of the Great Basin & Colorado Plateau through Community Partnership (6 days, 14 participants), which began in Las Vegas (Nevada), crossed northern Arizona and Utah and ended in Salt Lake City (IUFRO 2014d).

Very interesting one-day in-Congress tours were offered on 8 October, 2014. The range of their diversity to a certain extent reflected the diversity of attractions in North America:

- Alpine Hydrology – understanding snow science, water, and climate change in alpine environments (two excursions);
- Recreation Management in Alpine Ecosystems;
- Nature-Based Tourism;
- Forests to Faucets-Big Cottonwood Canyon Watershed Management;
- Urban Forest Research and Management - climate change implications and more;
- Tourism and Recreation Management (two excursions: morning and evening);
- Urban Forest Watershed Management;
- Hydrology and International Bird Migration in the Great Salt Lake;
- Salt Lake City Urban Forests;
- Walter Mueggler Research Natural Areas Hike;
- Forest Health in Northern Utah - Mirror Lake Highway;
- Forest Operations and Recreation Management;

- Wildland Fire Management and Post-Fire Restoration;
- Shrubland and woodland research and management, native plant propagation and more;
- Wasatch Plateau – managing for multiple uses (two excursions);
- Aspen Reproductive Ecology and Genetics;
- Pinyon Juniper ecology, and management;
- Arches National Park – Sightseeing Tour;
- Capitol Reef National Park – Sightseeing Tour;
- Pinyon Juniper Treatment, Mobile Pyrolysis, and the Great Salt Lake Marina;
- Aspen in Logan Canyon: Historical Impacts and Modern Indicators;
- Forest Assessment, Inventory, and Monitoring;
- Forest Biomass Utilization Demonstration;
- Forest Health in Northern Utah;
- Forest Operations and Management in Northern Utah;
- American West Heritage Centre – Sightseeing Tour.

The delegation of the Moscow State Forest University took part in tour IC-03: *Nature-Based Tourism*. All participants were impressed with the level of soundness, elaboration and implementation of natural features and attractions for tourism purposes. According to available statistics, as a result of such an approach, each tourist, visiting Utah, comes back with at least two companions.

After the closing of the Congress, the delegates and accompanying persons could participate in post-Congress tours, organized as a continuation of the professional work and exploring sights of North America. The description of the tours was drawn from the 24th IUFRO World Congress web-site at: http://iufro2014.com/tours/post-congress-tours/

Post-Congress Tour 01. Yellowstone, Tetons & Jackson Hole (3 days, 2 nights, October 12-14, 25 participants). "DAY 1 (10/12 Sun). Depart Salt Lake City this morning and drive north past the Great Salt Lake, and travel through the beautiful Snake River valley of Idaho to West Yellowstone, the western gate of our nation's first national park. Your evening includes a visit to the Grizzly and Wolf Discovery Centre where you will observe and learn about these magnificent creatures. DAY 2 (10/13 Mon) Today you will explore Yellowstone! This National Park is a mysterious land of steaming geysers and bubbling mudspots – a land so amazing that the first explorers to bring back tales of Yellowstone were called liars. Visit Yellowstone's famous highlights today, including Old Faithful, Fountain Paint Pots, and the spectacular "Grand Canyon of the Yellowstone." Just to the south of Yellowstone lies a jewel of mountain scenery: Grand Teton National Park. You'll pass by Jackson Lake and Jenny Lake's picture-postcard setting before arriving in the resort town of Jackson. DAY 3 (10/14 Tue) This morning you begin the day with a drive through rugged Snake River Canyon and pastoral Star Valley. See the stunning aquamarine blue of majestic Bear Lake before you enter the beautiful Cache Valley. Your lunch stop will include a visit to the American West Heritage Centre where you will learn the history of the west over the last 150 years. We will arrive in Salt Lake City at approximately 4:00 pm for your flights home. (L) Cost: $720.00 for Twin (2 persons per room) $898.00 for Single (1 person per room)".

Post-Congress Tour 02: National Parks Spectacular (4 days, 3 nights, October 12-15, 17 participants). "DAY 1 (10/12 Sun) Depart Salt Lake City this morning and travel south along the Rocky Mountains. This afternoon we visit Deadhorse Point with amazing views of Canyonlands National Park before arriving at Arches National Park, a monument to the silent forces of wind and rain. Arches has more natural stone arches than any other place in the world. After time to explore

and photograph some of the most spectacular arches we arrive in Moab and your hotel for the night. (L) DAY 2 (10/13 Mon) This morning we depart into the land of the Anasazi Indians, known to the Navajos as "the ancient ones". See Mexican Hat balancing rock on your way to Monument Valley, the most filmed area in the Western United States. Enjoy lunch at Gouldings Trading Post, site of many John Wayne films. After lunch meet your local Navajo guide and board 4 wheel drive vehicles for a tour of Monument Valley. Enjoy an up close and personal look at these well-known western landmarks. This afternoon we continue on past Glen Canyon Dam to beautiful Lake Powell, the second largest man-made reservoir in America. (L) DAY 3 (10/14 Tue) This morning you are on your way to Hollywood! (Little Hollywood, that is…) Kanab, Utah, has been the setting for more than 200 major motion pictures since the l930s. Next we visit Zion National Park which boasts some of the most colourful canyons, sheer rock walls and unique geological formations in the world. Enjoy lunch before traveling to Bryce Canyon National Park which is rimmed by pine and aspen forests and plunges more than 1,000 feet through multi-coloured layers of limestone. Overnight just outside the park. DAY 4 (10/15 Wed) Return to Salt Lake City, passing the childhood home of Butch Cassidy, as well as Big Rock Candy Mountain, made famous by a Burl Ives folksong. After lunch, continue north through the scenic Sevier River Valley. We will arrive in Salt Lake City at approximately 4:00 pm for your flights home. Cost: $950.00 for Twin (2 persons per room) $1175.00 for Single (1 person per room)."

Post-Congress Tour: International Wood Culture Society Sponsored Post-Congress Tour (3 days, 2 nights; October 12-14, 24 participants). "DAY 1 (10/12 Sun) The three day tour begins in Salt Lake City and heads north through Ogden, Utah to Jackson, Wyoming. We start the day with a visit to Fort Buenaventura which was the first permanent Anglo settlement in the Great Basin. After time to visit the stockades and historic log buildings of this settlement we wind our way through rural Utah to Montpelier, Idaho for a visit to the National Oregon Trail Centre Museum. DAY 2 (10/13 Mon) After spending Sunday night in Jackson, Wyoming we spend a full day in Yellowstone National Park enjoying the natural splendour. DAY 3 (10/14 Tue) On the third day we head back to Salt Lake City visiting a modern log home built by Teton Heritage Builders and learn about the state of the art in 'Log Cabin' construction. Finally we visit Logan, Utah and the American West Heritage Centre, a living history centre and historical farm before ending up in Salt Lake City late Tuesday afternoon."

Russian participation

Out of the 20 papers, submitted to the Congress from the Russian delegates (see the Table below), only 9 papers were presented: Antonova G.F., Muratova E.N., Haruk V.I. and Tchebakova N.M. (Sukachev Institute of Forest, Siberian Branch, RAS), Zamolodchikov D.G. (Moscow State University), Sanaev V.G. and Shalaev V.S. (Moscow State Forest University), Kulikova E.G. (WWF, Russia). One more participant from Russia Nikitin V.V. (Moscow State Forest University) was registered for the Congress without presentations/papers (see table below).

The Russian scientists, representing other countries, submitted about 20 papers. In addition, some Russian scientists, e.g., A.S. Alekseev (St. Petersburg State Forest Technical University), V.A. Usoltsev (RAS) and others, co-authored papers with foreign colleagues. Several presentations about Russian forests, forest management, non-timber forest resources in comparison with other countries were made by representatives of Austria, Finland, Sweden, and the Ukraine, e.g., A.Z. Shvidenko, M. Trishkin, V. Naumov, D. Shchepashchenko and others.

Participant	Title of a paper
V.N.Sukachev Institute of Forest, Siberian Branch, RAS, Krasnoyarsk	
Antonova Galina	Seasonal distribution of processes responsible for radial diameters and wall thickness of Scots pine tracheids
Baranchikov Yury	Bud gall midges on larch: factors of gall's form and function evolution
Kharuk Viacheslav	Siberian pine mortality in Southern Siberian Mountains
Muratova Elena	Karyological studies on Picea species
Parfenova Elena	A bioclimatic model of main conifer tree species height in the Altai-Sayan mountains, central Siberia
Ponomarev Evgeniy	Satellite Remote Sensing of Wildfires in Siberia for Quantifying Local to Global Effects of Wildfires
Tchebakova Nadezhda	Siberian potential forest types and fire load projected from IPCC climates in the 21st century
Pacific Institute of Geography, Far East Branch, RAS, Vladivostok	
Bocharnikov Vladimir	Protection of biodiversity and traditional lifestyles of indigenous peoples of Southern Siberia
Petrozavodsk State University, Petrozavodsk	
Gavrilova Olga	Methods of reforestation in Republic of Karelia
WWF Russia, Moscow	
Kulikova Elena	1. Introduction of Sustainable Forestry Best Learning and Practice into Russian Forest Higher Education: NGOs' Approaches 2. Russian Forest Policy Development: New Experience Based on Stakeholders' Involvement Approach
Tuvinian Institute for Exploration Natural Resources, Siberian Branch, RAS, Kyzyl	
Kuular Khulermaa	Mountain forest of Tuva estimation using Landsat images
NGO "Friends of the Siberian Forests", Krasnoyarsk	
Laletin Andrey	Sacral knowledge and traditional use of nature of indigenous people of Asian Russia
Institute of Biology & Soil Science, Far East Branch, RAS, Vladivostok	
Omelko Alexander	How to determine the minimum area needed for sustainable existence of tree species populations?
Ukhvatkina Olga	Why it is necessary to provide conditions for the formation of tree species population mosaics during development of forest management regimes
Moscow State Forest University, Mytishchi, Moscow Region	
Sanaev Victor	New National Forest Policy of Russian Federation: Basis for Forest Sector Problems Solution
Shalaev Valentin	Global Forest Information Service (GFIS) in Russia
M.V. Lomonosov Moscow State University, Moscow	
Zamolodchikov Dmitry	National forest sector greenhouse gas inventory: Russian example
"Viola" Scientific Non-Governmental Organization, Bryansk	
Zhirin Stanislav	Forest Management on the territory with the radioactive contamination (case study Chernobyl, Russia)
Zhirina Ludmila	Dendrological method as a biological indicator of radioactive contamination of forests

Interesting facts

It is worth to note that each tree, planted at the Planting Ceremony had a special meaning:

- Cedar of Lebanon (*Cedrus libani*): To commemorate IUFRO's long history and the location of the planting in the Lebanese section of the gardens.European Beech (*Fagus sylvatica*): To commemorate IUFRO's roots in Europe.
- Piñon Pine (*Pinus edulis*): To commemorate the importance of trees, and this species particularly, to the Native Americans who originally inhabited the region.
- American chestnut (*Castanea dentata*): To commemorate the role of research in combating a deadly fungus, Chestnut Blight (*Cryphonectria parasitica*), that virtually eliminated American Chestnut from America's forests in the early 1900s.
- Big-tooth Maple (*Acer grandidentatum*): To commemorate the joint Society of American Foresters and Canadian Institute of Forestry meetings co-located with the IUFRO Congress (IUFRO 2014i, p.15).

The IUFRO Incubator is a new form of scientific program of special sessions for students; it was introduced at this Congress. The IUFRO Incubator as a mechanism for work emerged as a result of discussions of the Congress Scientific Committee (CSC) and the International Forestry Students' Association (IFSA), and got further developed in the framework of the Congress. The goal of the Incubator is to provide students and young scientists with an opportunity to report about their work and discuss it with international audience of forest scientists and peers. At the three sessions of the Incubator, 69 papers were presented and one of them was delivered by Russia Vladimir Naumov (Russia), at that time, a student of the Swedish University of Agricultural Sciences (Vladimir Naumov *History of Russia's timber frontier through mapping forest use history*) (IUFRO Incubator 2014, p.80).

After the Congress in Seoul, the coverage of the IUFRO Congress became quite common in social networks. In particular, in social media, the notes with the hashtag #Iufro2014 were seen by over 561,000 twitter accounts over 3.6 million times; there are 55 blogs with more than 50,000 views; and the outreach though Facebook is measured in 18,000 users. In addition, nearly all significant events were recorded on video and posted on YouTube[302].

It should be mentioned that the first #IUFRO2014 Blog Competition was launched in June 2014 to provide a platform to display research and projects from around the world. The greatest number of votes, page views and discussions was recorded by the blog of Dr. Deepak Dhyani (Society for Conserving Planet and Life – COPAL, India) with his submission, called *Sustaining forests and people by conserving lesser known underutilised wild edibles*. Dr. Deepak won $500, while additional finalists received a copy of the *Forests and Globalization: Challenges and Opportunities for Sustainable Development*.

During the Congress, content generation through blogs and its sharing through various social media outlets (Facebook, Twitter, YouTube) were truly a foundation for successful outreach, inclusion, and communication efforts. A total of 142 blog posts (67 from Congress writers, 34 from the competition, 14 guest posts, and 26 videos) were made available leading up to and during the Congress featuring a variety of scientific topics (IUFRO 2014i, p.137).

By the beginning of the Congress, the Moscow State Forest University had published a two-volume book, written by Victor K. Teplyakov and Valentin S. Shalaev: *A History of IUFRO Congresses and Russia*. The work at this book was supported by their numerous friends and colleagues from more than 20 countries. At the Congress, this monograph was delivered to the IUFRO Presidents and Vice-Presidents, Division Coordinators, and other IUFRO officers. A

[302] http://www.youtube.com/user/IUFRO

number of copies were sent to universities and libraries in Russia and abroad, e.g., Austria, Canada, Denmark, Finland, France, Germany, Great Britain, Portugal, the Republic of Korea, the Republic of South Africa, Sweden, the USA, and a number of international organizations.

* * *

IUFRO entered the new millennium as a powerful global organization that brings together scientists, professionals, and students of all disciplines related to the forest. Friendly relations and partnerships with many international organizations, including the most visible in the international arena (the Collaborative Partnership on Forests) are the basis for the successful development of the Union in the future.

[The 25th IUFRO World Conference will be held in Curitiba, Brazil, 2019. The 2019-Congress booth at the IUFRO Congress in Salt Lake City, USA. Source: IUFRO Secretariat.]

It is not for nothing that IUFRO positions itself as *The World's Network of Forest Science* - it is the united efforts of all interested individuals and organizations which enabled the Union to achieve the results, to make impact on the global forest policy, and to help people and nature of many countries worldwide to live in harmony.

In 2017, IUFRO celebrates its 125th anniversary. The 125th IUFRO Anniversary Congress: *Interconnecting Forests, Science and People* will be held in Freiburg, Germany on September 19-22, 2017 (http://iufro2017.com/). By this date, many studies on the history of IUFRO, its development, progress, difficulties and successes will be published. The authors of this book hope that their work will be a modest contribution of Russia into the upcoming celebration.

Part Eight
IUFRO Convening Power

The idea to include such a chapter into the book reflects our great desire to share the reminiscences of those who personally participated in IUFRO events because it is not always possible to read about or to see some things. It is difficult to find recollections about IUFRO in either Russian or international literature though many well-known people were deeply engaged in its activities. Previous chapters offer information about IUFRO from publications in the Russian language, starting from the late nineteenth – early twentieth century (G.F. Morozov) and through the late 1920s (A.V. Tyurin) to our contemporaries (I.S. Melekhov and N.A. Moiseev) whereas this chapter contains recollections and shows views of many of the former and incumbent IUFRO Presidents, Vice-Presidents, Division and SPDC Coordinators, FAO representative and others who shared their memories with the authors specifically for this book to depict the organization from another angle, complementing its academic profile.

Chapter 31
Russian Voices

Scientific journals contain numerous publications of Academician I.S. Melekhov about the IUFRO Congresses and meetings which he attended. They are quoted in the previous sections of this book. In addition, he shared his impressions and information about IUFRO in his lectures and textbooks. His recollections and conclusions are very important for us not only because they remain relevant, but also because they constitute, indeed, historical evidence of high value and of great interest. Below, you will find extracts from Academician I.S. Melekhov's memoirs about IUFRO that are not cited in the previous chapters.

A few words about IUFRO[303]

Academician Ivan S. Melekhov
Russian Academy of Agricultural Sciences
Moscow Forest Engineering Institute/Moscow State Forest University
IUFRO International Council Representative from Russia in 1961-1971
IUFRO Executive Board Member in 1967-1975

"In 1929, Pr. N.P Kobranov had a meeting with his students in the conference hall (now, a reading room is there) of the [Saint Petersburg] Forest Technical Academy to tell them about his trip to Stockholm to participate in the 7th Congress of the International Union of Forestry Research Organizations (IUFRO).

[303] The heading and extracts were chosen by the authors.

IUFRO is the oldest international forest research organization and one of the oldest international research associations in the world. It was founded in about 1890-1892. Russian scientists have been participating in its activities since the year 1897, with the first of them being G.F. Morozov and A.N. Sobolev from the St. Petersburg (Imperial) Forest Institute.

Pr. G.I. Ryedko, Head of the Sub-Department of Forest Plantations at the Forest Technical Academy, found documentary evidence of the first provenance study plantations of the Scotch pine in Russia, established under the leadership of Pr. A.N. Sobolev, under a program of IUFRO. According to Pr. G.I. Redko, parts of those plantations, established in 1911 in the Okhta Forest Range, are still (1980) preserved. At the Stockholm Congress (1929), contributions from M.E. Tkachenko, A.V. Tyurin, P.S. Pogrebnyak and some other Soviet scientists are presented though they did not attend the Congress. N.P. Kobranov was, perhaps, the only representative from our country who attended it (A.Ya. Kalninsh was also there, representing Latvia, but Latvia was not included in the USSR at that time). In that period, people travelled abroad by boat or by train.

Listening to N.P. Kobranov, we were particularly keen to learn about the transportation and other services for participants of the Congress. E.g., Professors had been transported out into the field in a big vehicle, like a truck, while students rode motorcycles. At that time, there were neither automobiles, nor motorcycles in our forest sector (and not only in the forest sector), we could not even dream of it.

It seemed to us funny that during one of the field excursions on a rainy day, the Congress participates travelled by train and upon arrival to the forest, they were supplied with umbrellas, rubbers and high boots. Though, it was not difficult to provide them because then, participants of the Congresses were rather few: they were numbered in dozens. The IUFRO Congresses of the 1960s-1990s brought together from several hundreds to a thousand participants or even more.

Listening to N.P. Kobranov with interest, could I foresee, that my destiny would lead me to this oldest international research organization, that I would become its Honorary Member and that the Swedish Royal Academy of Agriculture and Forestry would make me its Foreign Member?!

Certainly, it could not occur to me even in a dream.

We, students of those days, listened to N.P. Kobranov with interest, but were very far from such things and even perceived them as abstract talks.

In contrast to pre-revolutionary graduates, we had no hopes for trips abroad to improve our knowledge. Though the term ‘iron curtain’ was not yet in use in the 1920s, it was imminently drawing. It was only 25 years later (after N.P. Kobranov’ trip) that some very limited opportunities to contact with the international forest community emerged. Teaching in a higher school, we were lucky to have at least some access to international novelties in respective occupational areas and sometimes (in exceptional cases) even to publish our papers abroad (though it was associated with high risks, I know it from my own experience).

A tangible opportunity to meet our needs in expanding and deepening the knowledge in the framework and beyond our studies was provided by student research teams (‘circles’). Under the Department of Forestry, there was a well-managed team (Forestry Research Team); it consisted of several groups, functioning under different sub-departments. E.g., there were groups of silviculture, private silviculture, forest mensuration, entomology, forest botany, etc. The leaders of the team coordinated the work in the groups, publishing activities (collections of student studies and other materials were published). There were even membership cards. We studied in the period of ‘efflorescence’ of such student research teams. According to official data for the academic year 1926/1927, every fourth student of the Institute was engaged in activities of such teams” (Мелехов 1992b, с. 52-54).

"I remember the VI World Forestry Congress in Spain in 1966. I was the Head of our Delegation.

...According to Academician Kairyukshtis from Lithuania, our rating was very high at the Congress in Spain – in his opinion, no other Soviet delegation had had such a high standing at World Forestry Congresses. I do not dare to judge whether it was really so; in addition, I did not attend the other congresses (except for the IUFRO Congresses). This is a special topic. Maybe, it deserves a separate discussion. Unfortunately, in the course of the preparation to international congresses, many mistakes and omissions were made. In particular, participation of the Forest Technical Academy in international forest congresses was very limited. On the one hand, it was its own fault (though, maybe, misfortune rather than fault), but on the other hand, it was decision-makers and officials of central forest agencies of that time who were really to blame for it as they often composed the delegations, proceeding from considerations which were far from benefits of forestry, the country, research or personal capabilities of scientists.

In early July 1975, Leningrad hosted the XII International Botanical Congress, organized with inputs from the Forest Technical Academy. A.A. Yatsenko-Khmelevsky was one the Vice-Chairmen of the Congress and also headed the Section of Structural Botany.

The Congress was a representative forum. It was attended not only by botanists, but also by specialists from the forest research community. E.g., one of its participants was Professor Walter Liese, President of the International Union of Forest Research Organizations (IUFRO) and a well-known expert in wood anatomy and biology.

Professor Philip Haddock, a prominent Canadian forest scientist, was also there; I had met him before: at the V World Forestry Congress in the USA. He was keen to know about my work related to taiga silviculture and forestry. His comments on it were very warm even there at the XII International Botanical Congress.

A group of participants of the Congress (including Professor W. Liese) visited the Forest Technical Academy, its Departments and the park. The Department, headed by A.A. Yatsenko-Khmelevskiy, hosted a modest welcome party which created a very warm, sincerely and friendly atmosphere. A.A. Yatsenko-Khmelevskiy showed great hospitality and could find a common language, in literal sense, with any of the guests (he could speak Russian, French and English). I am saying it as an eyewitness (Мелехов И.С. 1993, с. 94, 98-99).

"In 1992, the International Union of Forest Research Organizations (IUFRO) celebrated its 100th anniversary. It was founded in 1892, and Russian forest scientists (primarily, Professors from the St. Petersburg Forest Institute) started to take part in its activities in 1897. The most active participants of that international work were Professors G.F. Morozov, A.N. Sobolev, then N.P.Kobranov and some others. IUFRO is a permanently working international research organization, embracing all areas of forest science without exception (from forest cultivation to production of pulp and paper).

The Forest Technical Academy should have joined IUFRO as a member organization. To its credit, the present-day Forest Technical Academy, as represented by some of its selected scientists (Professor G.I. Ryedko), is resuming the experiments, initiated long ago in the St. Petersburg Forest Institute under programs of this international organization. When the Forest Technical Academy officially joined IUFRO, its prospects for further progress in science broadened (Note of the author: *Currently, the IUFRO's Russian member organizations are* the Institute of Forest and Wood of the Siberian Branch of the RAS, Moscow Forest Engineering Institute and Russian Research Institute of Silviculture and Forestry Mechanization/VNIILM) (Мелехов 1993, с.102-103).

About IUFRO[304]

Academician Alexander S. Isaev
Russian Academy of Sciences
Centre for Ecology and Forest Productivity,
Russian Academy of Sciences, Moscow
Participant of many IUFRO Congresses

"There is such an organization as IUFRO. It is the International Union of Forest Research Organizations. It was established more than 100 years ago; it brings together 120 countries and holds major global forest congresses every 5 years, primarily, with a focus on applied research. An incredible thing happened! At each Congress, a gold medal with a small prize (as they put it), amounting to about USD 2,000, were awarded. So, in 1976, I was invited to participate in the competition for such a gold medal.

I informed A.B. Zhukov[305] about this invitation. He recommended accepting it – 'just in case'. Moreover, I am still wondering how I could become the only Soviet forester out of 42 candidates[306] to win that competition. The medal was presented by the Crown Prince of Norway (now, he is the King of Norway). During our trips through Norway, our group was led by Thor Heyerdahl – it was then when we met. That was really great! Then, one thing led to another. Anatoly B. Zhukov retired at the age of 75, and identified me as his successor in the Academy of Sciences of the USSR. In addition, I had that gold medal from the reputable Congress. In that way, I became a Corresponding Member of the USSR Academy of Sciences. It coincided with the rollout of our space-related activities, and the Institute became visible throughout the country".

Interviewed by Sergey Churilov
Daily newspaper "*Vecherniy Krasnoyarsk*", №1 (45) Wednesday, January 11, 2006

IUFRO: flashback and wishes to our successors

By Nikolay A. Moiseev
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VNIILM, Pushkino, Moscow Oblast,
IUFRO Executive Committee Member, 1976-1985
IUFRO International Committee Member, 1976-1990

My direct contacts with IUFRO started from my participation in its Congress in Gainesville, Florida, USA, in 1971. It was a cool March in our country, but there, the sun was so hot (35° C) that it was dangerous to go to the field trip without headwear. We flew there together with my teacher Academician I.S. Melekhov and Professor N.G. Kolomiets, a forest pest management expert from Novosibirsk.

Gainesville was a small university town; it hosted the Congress which brought together over 2,000 participants from many countries. As the youngest member of the delegation (I was 41 years old) and, at the same time, as the Director of the Department of Science, Best Practices and Public Relations of the USSR State Forestry Committee, I had to establish contacts with the foreign world

[304] The heading for the extract of the interview is that of the authors.
[305] Academician Anatoliy Borisovich Zhukov (1901-1979) was a specialist in oak forests. He was an editor of "Forests of the USSR" in five volumes. At that time, he was a Director of the V.N.Sukachev Institute of Forest, Siberian Branch of the USSR Academy of Sciences, Krasnoyarsk.
[306] Actually, there were initially 40 and then 43 candidates, with only 5 to be selected.

and top management of this global organization and to work out a strategy of mainstreaming our research and education institutions into its activities. It was quite clear that personal contacts were the best tool for that purpose. But it was not as easy as it might seem. However, life provides chances and opportunities. At first, I.S. Melekhov took the lead as he had had contacts with this organization before the Congress. My research fields included forest economics and forest management planning; therefore, I had already had interesting meetings with international scientists through participating in discussions of respective papers as arranged by IUFRO. As usual, the biggest delegation was from the USA, and I was keen to establish contacts with "stars" in forest economics and forest management planning, I met them and got their papers, e.g., textbooks by R. Gregory, K.P. Davis, A. Worrell and others. Since it happened 40 years ago, I cannot recall all details of these meetings. However, my general impression was that there was good will and friendliness on the part of the people I met for the first time, and their readiness to establish and develop business cooperation. My official position was helpful as I was not just a private person.

This first trip and the following two-week field tour raised my awareness of forest management and forest research frameworks and practices abroad. The trip ran across three states: Florida, Georgia and North Carolina and included visits not only to forest management agencies but also to residence places of various forest officers which contributed to better understanding of the way of life and forest business in this country where I came again later with Professor G.I. Vorobyov, Chairman of the USSR State Forestry Committee, in the capacity of the first Chairman of the Soviet-American Working Group for Forestry to sign the Forestry Cooperation Agreement. At that Congress, Professor I. Samset (Norway) was elected IUFRO President; and I met him at next IUFRO Congress in Oslo in 1976 where I was the Leader of the Soviet Delegation.

I remember one important fact which greatly contributed to the development of contacts with this organization for many years ahead. Many scientists from West Germany, including veterans of World War Two, participated in the field trip. I was surprised by their considerate and rather regardful attitude to our delegation. During a lunch break, one of them - Professor R. Magin - mentioned that he was awfully sorry about the war that had brought about great misfortune to peoples of our countries. He had been badly wounded and still suffered from the wound. I told him that in our country, many people had relatives who had perished in that war, including my father and his brother; they had been killed at different front-lines, the father on the Norwegian border and his brother near Moscow. Professor Kolomiets joined the conversation, and they found out that he and Professor Magin had fought in the North Caucasus at the same time, but on the opposite front sides. That meeting and our talk were the beginning of our sincere relations, willingness to have business contacts and sustain them by all means. Professor Magin was an influential person among scientists of West Germany; at that Congress, he was appointed Coordinator of the Forest Economics and Forest Management Division. In Norway, the Congress elected next IUFRO President: it was Professor Liese, Director General of the Forest Research Institute in West Germany. During the Congress, Professor Magin gave me a note, saying "Dr. Moiseev, you will be a Member of the IUFRO Executive Committee". I presume that he and the new IUFRO President W. Liese contributed to the establishment of our business and friendly relations which are still continuing. Professor R. Plochmann, the new Division Coordinator, who succeeded Magin, kindly invited me to attend sessions of his Division. It was a proof of the wisdom of the advice from my first scientific supervisor A.A. Baitin who said: "if you manage to establish good human contacts, everything will favour your undertakings".

In that way, I was included and integrated in the IUFRO research family. All the other meetings were conductive to the efforts to broaden contacts of our research and education institutions with this international organization.

I participated in all the subsequent IUFRO Congresses and FAO World Congresses, until 1996. In 1976-1985, as a Member of the IUFRO Executive Committee and later as a Member of the IUFRO International Committee, I attended the IUFRO Executive Committee Meetings in various countries, including Russia. During that period, the IUFRO Presidents were Professor D. Mlinsek (Yugoslavia), Professor Buckman (USA), and Dr. Salleh (Malaysia). The later elected Presidents were awarded the title of the *Honourable Doctor of the Moscow State Forest University*, and I met them in Russia during the award ceremonies.

Below, I am highlighting the significance of IUFRO activities rather than individual Congresses. Since the overarching goal of this international organization is consolidation of the world research community's efforts in priority areas, linked to key challenges for the mankind development and its interactions with nature. Exchange of opinions can trigger follow-up studies and have a catalytic effect on research activities, but is sometimes underestimated among scientists. All Congresses as well as international conferences and workshops of respective divisions and sections of these organizations provided good opportunities for that. As a Member of the IUFRO Executive Committee and sort of a National Focal Point for the development of forest science and international cooperation, I took advantage of the opportunity to host IUFRO international conferences, sponsored by the USSR State Forestry Committee and then (after the disintegration of the USSR) by the Ministry of Forestry of the Russian Federation, with both of the government agencies being keen to host such events and support them. During my work as the Director of the Department of Forest Science (1970-1977) and the Director of VNIILM (1977-1996), we organized five big international conferences: on forest stand establishment (1980), thinning (1985) and three conferences on forest management in the market economy (1992, 1994, 1996).

Those conferences brought together the best scientists from different countries and continents, IUFRO top management and our forest research and education institutions and specialists of forest industries and other organizations of the federal and regional levels. As a rule, we prepared and copied conference papers in the Russian and English languages before the conferences, and arranged simultaneous translation to enable exchange of opinions. The conference proceedings and decisions were timely published in various languages and disseminated to conference participants. Following international practices, we offered field trips for conference participants to specific sites in experiment forest management units under the VNIILM and its forest experiment stations as well as other facilities of the Russian Ministry of Forestry. Benefits from those events were great and multifaceted, without exaggeration. Firstly, our scientists and specialists obtained valuable information from the first hands - directly from foreign colleagues. In the meantime, direct contacts and follow-up agreements were established, and formal invitations to visit foreign institutions were received. E.g., at one of the forest economics and forest management conferences, three specialists of the VNIILM's Economic Department, including its Director P.T.Voronkov, were invited by the USA delegation to visit research institutions there.

It was important for foreign scientists to find out that Russia had a vast network of forest research and education institutions and possessed high intellectual capacity which was not worse than that of advanced countries, and even surpassed it in some respects. The most vivid point of such recognition was the meeting of the IUFRO Executive Committee in Russia in 1980. It brought together leaders from the IUFRO Divisions. The meeting was hosted by the VNIILM and its Caucasian Branch in Sochi, and its participants visited also other Russian research and education institutions as well as field facilities under the experimental and ordinary forest enterprises. It is noteworthy that the Director of the French Forest Institute (Nancy), referring to the VNIILM, called it "the big world institute". In that time, it was not an exaggeration. The VNIILM had an extensive network of forest experiment stations, experiment forest districts in various regions, a robust entity,

designated to design forestry machinery (TsOKB – Central Experimental Design Bureau of Forestry Mechanical Engineering) and experimental works. The R&D staff of the Institute alone was 500 persons; about 400 designers and other specialists worked in TSOKB; and 600 persons were employed by the Experiment Forest District in Sergiev Posad with its good forest nurseries. The forest experimentation network also had high capacity. Of course, foreign colleagues were greatly impressed during their visits. It should be noted that the today status of the same facilities is incomparably worse. Being familiar with similar institutions in other countries, including the USA, Canada, France, United Kingdom, and Finland, I can assure you that in that time, Russia was not lagging behind them in terms of forest research and experimentation though it did not apply to practical forest management.

Anyway, in that time, Russian research and education was not inferior in comparison with other countries, and it created enabling environments for collaboration of our research community with foreign colleagues during all IUFRO events and activities. However, it should be also noted that foreign colleagues sometimes criticized their practical forest management as well. E.g., in Canada of the 1990s, its forest management was sharply criticized by national scientists and specialists and it was reflected in their reports. It is known that Canada faced an 'obstruction' as a timber exporter in the world arena for the predatory exploitation of its forests and their bad management. Normal reforestation returned after 1990.

Compared to the USA, Russia could be positively distinguished owing to its best practices in forest fire management and extensive shelterbelt establishment which was officially recognized by the U.S. Forest Service and the latter was keen to learn from us. Our experts in these areas were 'in great demand' and it was reflected in the plans of R&D cooperation between the USA and USSR/Russian Federation.

In our forestry mechanization and forest industries, the performance was not as bad as it is now. In that time, our specialists had peer discussions of technical problems in that area with foreign colleagues including those from Scandinavia. Nobody could predict the worsening of the situation and our future dependence on imported machinery. We were not facing this treat.

Though, since 1985 when Gorbachev came to power, the USSR disintegration started (according his own words), and the updating of enterprises' equipment slowed down; and since 1991, after the USSR disintegration, the overall decline in production affected the forest sector as well. For this reason, the demand for research and later for education dropped which impaired its capacity and human resources. Metaphorically speaking, the past level of our forest research and operation was 'the height of its glory' compared with what we have now. Accordingly, compared with the past situation, Russia's involvement in activities of IUFRO (celebrating its 120th anniversary now) significantly reduced. Certainly, individual organizations and persons continue to collaborate with this organization, but now, Russia rarely hosts such large-scale events as it used to host.

In 1971-1995, the number of IUFRO member organizations significantly increased, and that period saw substantial enhancement in the involvement of our scientists in activities of its divisions and working parties. Many academic and applied research institutes, and forest higher education institutions joined IUFRO and their specialists took an active part in its activities. Now, our aim is to preserve the membership of national institutions in this organization and revive their engagement in its work substantively rather than formally. In the context of the poor financial situation of our forest research and education institutions, public support is evidently needed, especially, for young scientists to go abroad to participate in IUFRO work. Hopefully, when the new Heads of State and Government take their offices once elected, they will keep their promises to improve the government attitude to science and education.

Quarter of a century with IUFRO

By Victor K. Teplyakov
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IUFRO Division 4 Deputy Coordinator, 1996-2000
IUFRO Board Member, 2001-2010

My acquaintance with IUFRO started during the postdoc traineeship in the United States. Initially, however, the USSR Ministry of Education sent my documents to Finland, but Professor Pekka Kilki replied that he would be on his sabbatical leave and unable to accept the newcomer. Thus, instead of the University of Helsinki, in September 1988, I found myself in the Department of Professor William MacConnell at the University of Massachusetts Amherst, MA. It is with great warmth that I remember my colleagues there and we remain friends now – David Kittredge, Patrice Haru, Matthew Kelty, John Finn, Joseph Mawson and other professors.

One day, Professor Patrice Harou brought news about the IUFRO Conference on Forest Modelling to be held in Newcastle-upon-Tyne, United Kingdom. I was keen to contribute to the meeting. Professor George Gertner from the University of Illinois, Urbana-Champaign, IL, was one of its organizers. I sent my application letter to him, struggling with the Internet, which was a new way of communication in that time. The positive reply came with no delay! My first publication abroad was an extract from my Ph.D. thesis, related to self-regenerated forest areas, e.g., distribution of seedlings and saplings, described by the Poisson equation. I could not afford to attend the conference, but Professor Gertner read my paper there. He significantly improved my English in the article and it was published in the conference proceedings. Then, he invited me to his group on modelling and statistics. So, in 1988, I joined the IUFRO Working Group.

On the eve of 1989, at the dinner in Jack Finn's place, I met William Warren from Canada. Soon, both of us were surprised to find out how much we had in common: biometrics and forest statistics, forest modelling and forest inventory, etc. He told me about IUFRO, and I tried to understand how this organization could penetrate into many structures and connect so many people completely unknown to each other until a certain point of time? Understanding came, as usual, later...

One day in March 1989, I got a call from the USDA Forest Service to be invited to come to Washington, D.C. for 2-3 days. Later, it became clearer that the Forest Service was preparing for the visit of Academician Alexander S. Isaev, Chairman of the USSR State Forestry Committee – it was the first visit of such a high level in the history of relations between the United States and the Soviet Union. I was invited there because after the long visit of Professor M.E. Tkachenko to the USA in 1930, I was the first Soviet forestry specialist who came for a long time to this country. The U.S. Forest Service wanted to get first-hand information about forestry in the USSR.

During that trip, I met many officers and specialists from the U.S. Forest Service, including its Chief Dale Robertson, his Deputy Jerry Sesco, Directors, Deputy Directors and employees from almost all US FS Departments: David Harcharik, Brian Payne, Harold Fred Kaiser, Stanley Krugman, Susan Conard and others, many of whom were actively involved in IUFRO activities. Later, Dr. D. Harcharik became the Head of the FAO Forestry Department, Deputy Director General of the FAO, and during his term, IUFRO-FAO contacts were strengthened.

In 1990, on my way from a trip, I met several foreign colleagues in the airport. They were returning from Arkhangelsk after the *Northern Forest* Conference, organized by the USSR State Forest Committee. At the Conference, it was decided to establish the International Boreal Forest Research Association (IBFRA). Later, in summer, Professor Gertner came to Moscow, and we

visited the USSR Forest Research, Design and Planning Association (*Lesproekt*) and other organizations to assess their capacity to host a IUFRO conference on forest statistics and modelling. In the Moscow Forest Engineering Institute (now – Moscow State Forest University), we had a detailed discussion with Professor Oleg A. Kharin, Dean of the Forestry Faculty, and with Rector Alexander N. Oblivin, both of them were very keen to have such an international conference.

I could not participate in the IUFRO World Congress in 1990 in Canada, but per recommendation from Professor George Gertner (USA), I became a Deputy Coordinator of Working Party S4.01-11. Later, there was a lot of talk about the IUFRO Centennial, but, again, I was not able to visit Germany in September 1992 because I was preparing for my second long-term trip to the USA as a Charles Bullard Fellow at Harvard University (1992/93).

Without belittling the merits of many excellent teachers who taught me in the MSFI in the 1970s, it should be said that I was fortunate to be a student of the four great scientists, educators, public and state figures: Academicians Nikolay P. Anuchin, Ivan S. Melekhov and Sergey S. Sobolev, and Professor Alexey I. Vorontsov. I often talked with Professor Anuchin when I was his Ph.D. student (unfortunately, the last one) about the World Forestry Congresses he had participated; whereas Professor Melekhov often talked about IUFRO, international development of forest science, IUFRO Congresses, scientists, inner forms of English, Russian and German forest terminology, etc. Free communication with the Academician always amazed me: he never let me feel the distance between us, preconditioned with the huge difference in the age, experience, knowledge, and titles. And yet, I'm still surprised with his capabilities, vigour and efforts to promote IUFRO in the USSR and Russia. Perhaps, there is no other person who published so many papers about IUFRO, its history and current activities and participation of Russian scientists in its Congresses. I was very happy when Ivan Stepanovich wrote the Foreword for my first book: *The Forest in the History of Pre-Petrine Russ,* published in 1992.

The first major IUFRO event, I attended, was the conference, organized in 1994 by the Russian Research Institute of Silviculture and Forestry Mechanization (VNIILM) and sponsored by the Russian Federal Forest Service. I was invited as an official representative of the Federal Forest Service (being the Deputy Director for Science and Technology), and as an official, involved in the meeting preparation. There were memorable meetings with such IUFRO leaders as Klaus von Gadow (Germany) and Niels E. Koch (Denmark), and H. Fred Kaiser and David Klemperer (USA) whom I had met earlier, to name just a few; and many new contacts were established.

It was much easier to organize the next meeting in 1996 because it was not the first conference for VNIILM. However, it was much more difficult to finance it. The country was falling into an abyss, but it had to meet its commitments. In the capacity of the Director of the Department of Science and Technology of the Federal Forest Service[307] and Deputy Coordinator of IUFRO Division 4, I tried to help in organizing the meeting because it was a joint conference of IUFRO Divisions 4 and 6. Here, I must pay a tribute to Academician Nikolay A. Moiseev who assumed the burden of hosting very expensive international conferences, in addition to his routine work as the Director of the Research Institute with its numerous staff and extensive regional network of forest experiment stations. Of course, the Federal Forestry Agency (FFA) helped as it could, but I cannot help admiring the optimism, perseverance and will of N.A. Moiseev and his ability to find ways out of difficult situations and adequately host the conferences.

My first Congress was the IUFRO World Congress in Tampere, Finland, in 1995, where our team was led by Academician Anatoly I. Pisarenko, Deputy Chief of the FFA. We went there from Joensuu, after participating in an IBFRA conference. The Congress struck me with its scale, friendly

[307] Between 1994 and 1996, the Federal Forest Service was renamed into the Federal Forestry Agency.

atmosphere, in-Congress tour to the Koli National Park, wonderful exhibition, dedicated to the history of IUFRO and, of course, numerous meetings and interesting discussions. In Tampere, Professor Harold Burkhart, Virginia Polytechnic University, USA, and I were elected Deputy Coordinators of IUFRO Division 4, headed by Professor Klaus von Gadow, University of Göttingen, Germany. We became big friends. Of course, IUFRO President Salleh played an active role in this appointment. I was very happy when my colleagues and friends G.Gertner, H.Burkhart and H. Gyde Lund received the IUFRO Distinguished Service Award.

During the Congress, I met almost all previous IUFRO Presidents whom I had not met before, but I had heard about them from Academicians I.S. Melekhov and N.A. Moiseev. I am grateful to Walter Liese and Robert Buckman for their long talks with me at that and other Congresses, their reminiscences and advice. Talking with Professor Buckman about forest science in the USA, I was surprised to find out that many professionals, scientists and educators on both sides of the Ocean were familiar to both of us. I was pleased that our views coincided in most areas of forest science both at the national and international level, especially concerning forest functions, forest fire, forest pests, forest management and reforestation, and, of course, forest science.

During the Congress, a small group, gathered by Professor N.A. Moiseev, discussed how Russia could host a IUFRO symposium on rotation periods. We tried to convince foreign colleagues of the need for an ongoing analysis of the aspect in different countries. All was in vain. The main argument against it was confined to: “We have a market economy, there is no problem. Why should we harvest, if there is no demand. Let the forest grow longer. If there is a demand for wood, we will start harvesting”. Then, I recalled the words of Professor M.M. Orlov who said that prior to planning the forest management operations, it is necessary to assess the markets. However, the problem was important for our country. In 1996, the VNIILM organized a conference, and this issue was discussed among other things, though, from a different perspective, related to market conditions, rather than planned economy.

In 2000, during the IUFRO World Congress in Malaysia, I was nominated by President Jeffery Burley and became a Member of the IUFRO Executive Board as a representative of Eastern Europe, and the Representative of the Russian Federation in the International Council, succeeding Dr. Valentin V. Strakhov. It was interesting work: we had to address many challenging issues while drafting a IUFRO strategy, rearranging the Task Forces (TF) and revising the approaches to study all types of forests. The Union became an active member of the recently established Collaborative Partnership on Forests (CPF), and it was the beginning of IUFRO’s development as a political actor. As a result, IUFRO began to develop the Science-Policy Interface, and a relevant TF was created.

In Russia, major changes were put on agenda as well. It was necessary to strengthen the presence of Russian organizations and scientists in IUFRO and its governing bodies which would help to address many current and strategic issues. We talked with Vice Rector of the MSFU Professor Valentin S. Shalaev about how to establish an Association of IUFRO Member Organizations in Russia. Upon consultation with all IUFRO members in Russia, the Association was created, and it continues to develop and function thanks in large part to Professor V.S. Shalaev.

The beginning of 2003 was marked with the overwhelming work to prepare the proposal to compete for the right to host the IUFRO World Congress-2010. I worked in the IUCN, heading its Forest Program for Russia and the CIS. Nevertheless, we prepared a request from the VNIILM as a IUFRO member institution with good reputation and robust experience in organizing international conferences. In the summer of 2003, members of the IUFRO Management Committee (MC) visited Russia to assess its capacity and conditions for the Congress. They visited the Moscow State Forest University, VNIILM and VIPKLH (Russian Institute of Continuous Education in Forestry). Several days passed like one day. The visit included meetings, trips to the Sergiev Posad Experiment Forest

District and Ivanteevka Forest Nursery, a master-class of matryoshka painting in the Sergiev Posad Museum and a visit to the Tretyakov Gallery and Kremlin in Moscow... It did not help! We lost to Seoul, Republic of Korea on financial proposals. After all, the country just started to recover after the decades of purposeful destruction.

In early 2005, long before the Congress in Australia, Professor Barley invited me to apply for the position of the Coordinator for IUFRO Division 4 to try to be competitively selected. Regretfully, I had to refuse because there was a lot of work through the IUCN to prepare the Ministerial Conference on Forest Law Enforcement and Governance in Europe and North Asia (ENA FLEG) in St. Petersburg in November 2005. However, the success and importance of the ENA FLEG Conference enabled me to justify the decision to establish a Task Force on Illegal Logging and FLEG in IUFRO with the mandate for 2006-2010, and such a decision was adopted. Six months before that, I had been appointed Coordinator of the IUFRO Global Programme on Temperate and Boreal Forests, and I was not able to spend sufficient time for the above Task Force.

A remarkable event of the year 2003 was the selection of Academician N.A. Moiseev for the IUFRO Distinguished Service Award: he was the first and still the only winner of this award from Russia. His nomination was, no doubt, deserved, but the decision had to be seriously justified and advocated. At that point, I understood that IUFRO awards were not easy to get, they should be 'earned' through serious and long work! I am very proud and happy that I had the honour to make a presentation and hand over this deserved award to Academician N.A. Moiseev whom I regard as my teacher and adviser. The event took place in the Rector's Office in the MSFU.

In 2005, the IUFRO World Congress (Australia) did not change my IUFRO position as newly elected President Professor Risto Seppälä extended my mandate for a new term by proposing the Council to support his nominee. The Congress itself resembled a great fiesta with its unity of scientists from different countries and continents. Although Australia is called "down under" which is translated as "the country where everybody goes upside down"[308], the Congress did not go "upside down" owing to the excellent work of the Congress Organizing Committee, headed by Gary Bacon, who had had actually to quit his job at the Australian Forest Service to devote himself entirely to the preparation of the Congress – the first in that part of the world. After that, the list of the IUFRO Congresses had only two "white spots" where IUFRO World Congresses were never held: Africa and South America.

The relations between IUFRO and IUCN have been ever free of undue tension since the IUCN foundation in 1948. The IUCN is often invited to IUFRO conferences and Congresses and *vise-a-versa*, but there had been no agreement, similar to that between IUFRO and FAO. The break-through happened in 2005, and the cooperation agreement was signed at a meeting of the IUFRO Enlarged Executive Board. I am proud that I was involved in and contributed to this development.

IUFRO Congresses offer a lot of useful information which would be, otherwise, unavailable even after targeted search. Particularly, it pertains to the reports that are not directly related to one's area of research. I found it out right during that Congress, but one presentation struck me most of all. Dr. Michael Wingfield from South Africa spoke about transferring pests in ships, not so much in the cargo itself, as on its surrounding items (pallets, ballast water, shells and so on). Numerous pests, sea-terminals and transportation paths were mapped, and the map gave a painful impression. But unless the problem is known, it is impossible to cope with it!

It is often heard that a 'chance' brought people together, helped to attain something, etc. But most likely, it is our own action or inaction which is responsible for the emergence of such chances.

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[308] There is a song "Down Under" (Australia), and in the Russia language, there is a riddle "Who beneath us is upside down?"

Indeed, it is impossible to get something honestly without investing one's own energy, knowledge, experience and time, without sacrificing something. To my mind, in forest science, it is IUFRO which is shaping international frameworks, underlying such "chances", offering opportunities to take them, and often to succeed.

For example, it may be referred to participation of students and young scientists from developing countries in IUFRO activities and events. The IUFRO World Congress in Seoul, Republic of Korea (2010) is the most notable in this respect because IUFRO President Professor Don Koo Lee declared that to support young people was one of his top priorities. It should be also noted that the Republic of Korea allocates substantial funds for grants, scholarships, projects and other financial assistance to support its students as well as youth and students from developing countries.

At the last two IUFRO World Congresses (2010 and 2014), I was elected Deputy Coordinator and an officer of Research Group 9.05.00: Forest Policy and Governance. I was also happy that my old friends and colleagues were elected IUFRO Presidents: Professor Niels E. Koch was elected IUFRO President for 2010-2014, and at the last Congress in Salt Lake City, USA, Michael J. Wingfield was elected IUFRO President for 2014-2019.

I was lucky to live this IUFRO life for a quarter of a century and briefly describe the experience, which, hopefully, can be useful for future generations of foresters in Russia, the country that should take its rightful place in the world not only owing its vast area and abundant resources of its forests, but also owing to its better positioning in top international forest organizations!

From Congress to Congress

By Professor Valentin S. Shalaev
Moscow State Forest University
IUFRO International Council Representative, 2006-2019

In 1969, I graduated from the Moscow Forest Engineering Institute (now, renamed into the Moscow State Forest University) and started to teach there. Since then, I came across information about IUFRO occasionally, from time to time. That information was from publications and also from my talks with Academician I.S. Melekhov who was a highly committed promoter of IUFRO till the end of his life. In recognition of his most valuable contribution, he was awarded the title of IUFRO *Honorary Member* at the 18th IUFRO World Congress in 1986.

As regards the first meaningful acquaintance with IUFRO, it happened at the 18th IUFRO World Congress in Ljubljana (Yugoslavia) in 1986 where I went by chance – owing to a coincidence of different circumstances. It was not easy in those days to go abroad from our country, among other things, due to complicated formalities. Nevertheless, I was included in the Soviet delegation. At that time, only two Soviet research organizations were members of IUFRO: the Institute of Forest of the Siberian Branch of the USSR Academy of Sciences and the National Research Institute of Silviculture and Forest Mechanization/VNIILM. The Soviet delegation consisted of fairly well-known people in the forest community and was headed by Professor N.A. Moiseev, Director, VNIILM. Professor Moiseev was a Member of the IUFRO Executive Board in 1977-1985 and IUFRO International Council Representative from Russia in 1977-1990; in 2004, he was granted the IUFRO Distinguished Service Award. The two weeks in Yugoslavia and close communication with such people enabled me to gain a deeper understanding of the situation, role of forest science in our country and in the world, and of IUFRO activities and opportunities for international cooperation.

At the plenary meeting, Professor Dušan Mlinšek, IUFRO President, and Professor Walter Liese, IUFRO Ex-President, delivered very interesting reports, highlighting, respectively, prospects for research in forestry and forest products for the benefit of the global forest sector and generated much interest among the audience. Their substantive speeches, their personalities and their capacity as leaders of the global forest science strikingly impressed me and still remain in my memory. Later, the real life confirmed most of their foresights, and even 29 years later, some citations from those reports remain up-to-date.

Another most impressive report was made by Robert E. Buckman; it was titled: *Bringing forest sciences to bear on socioeconomic problems of the developing world*. During the award ceremony, I saw Dr. N. E. Koch for the first time; later, both of them became IUFRO Presidents. After the Congress, I was lucky to get to know Dr. Koch better, to meet him in different countries and in Russia, to attend the meeting of the IUFRO International Council which elected him to be the President of IUFRO in 2010 during the IUFRO Congress in Seoul, and also to welcome him at the Moscow State Forest University in 2011 to award the title of the Honorary Doctor of the Moscow State Forest University. Professor Koch rendered essential support to us in collecting inputs for this book: it would have been impossible to publish it in this timeframe without his help.

At that Congress, I was primarily engaged in the work of Division 5: *Forest Products*, made a respective presentation as part of it, and had the pleasure of a brief talk with Division Coordinator Robert L. Youngs from the Virginia University (USA), a renowned scientist in the area of wood physics, wood mechanics, wood-working, wood drying, etc. Though the meeting was brief, I remembered it and was keen to track his further achievements (in particular, in 1992 he was awarded the title of IUFRO Honorary Member) and recommend the Scientific Council of the Moscow State Forest University to grant him the title of the University's Honorary Doctor.

During the Congress, I had an unexpected meeting with Professor Adolf Priesol, Rector of the Technical University in Zvolen, where had been for an internship in 1976 (in the Department, headed by Professor Josef Palovic, a well-known scholar in wood-working technology, one of my scientific advisors and a very charismatic person). Before and after the Congress, our Universities closely collaborated, among other things, under the IUFRO Conferences. Cooperation with disciples and colleagues of Professor Josef Palovic continued and remains ongoing. The Delegation of Czechoslovakia included many of the colleagues whom I had met before. They were Juraj Detvaj (he is still working in the 'related' Department of the Technical University in Zvolen), Stefan Smelko (later, he became a Vice-Rector of the Technical University in Zvolen), Jozef Kolenka (a well-known forest economist), Stanislav Kurjatko and Jozef Mahut (wood scientists), Jan Ilavsky (later, he became the Director of the Zvolen Forest Research Institute), Emil Klimo, Ladislav Paule (later: Coordinator of Division 2 and IUFRO International Council Representative). I met many of them many a time again in different countries and at the IUFRO conferences and Congresses.

The Congress enabled me to get acquainted with presentations, reports, posters and other contributions of many foreign scientists, whose proactive position was very conductive to our professional growth and success, including fruitful efforts under IUFRO activities. Many of them became our counterparts in closer communication and cooperation. They include Alexandr Alexandrov from Bulgaria (later: Director of the Academic Forest Research Institute in Sofia, IUFRO International Council Representative); Max Krott from Austria (Professor, University of Gottingen) who repeatedly came to Russia and visited our University; Risto Seppala (later: IUFRO President and Honorary Doctor of the Moscow State Forest University), Hannu Raitio from Finland (later: Director of the Forest Research Institute METLA, at that time, IUFRO International Council Representative); J.-L. Peyron from France (later: Coordinator of Division 4, IUFRO) whom I repeatedly met during IUFRO events and on other occasions; Davide Pettenella from Italy (with

whom our University closely cooperated under the Tempus Program); Birger Solberg from Norway (IUFRO International Council Representative); Lisa Sennerby Forsse from Sweden (later: Chancellor of the Swedish Agricultural University, which collaborates our University); Richard Szymani and Howard Rosen (who visited our University later) from the USA and others.

The sessions of the Congress, field trips to visit forest management and timber industry operations in Yugoslavia, openness, hospitability and friendliness of Yugoslavian colleagues – all these impressed us and remained in the memory of all members of our delegation. Cordial meetings with Yugoslavian colleagues gave rise to our long and continuing friendship and collaboration with Vlado Hitrec, Boris Ljuljka (Coordinator of IUFRO Division 5 from Yugoslavia), Miroslav Benko (later: Director of the Forest Research Institute in Jastrebarsko), Tibor Littvay, Dijana Vuletic (later: Director of the Forest Research Institute in Jastrebarsko and IUFRO International Council Representative from Croatia), Marian Breznjak (one of my advisors in research) from Zagreb; Dusan Jovic (Dean, Forestry Faculty, University of Belgrade and later: Honorary Doctor of our University, a legendary personality who had met Josip Broz Tito), Radko Kadovic (later: Dean, University of Belgrade), Petar Todorovic, Borislav Soskic, Milan Medarevic (later Dean, Forestry Faculty, University of Belgrade).

Overall, I was greatly impressed with that IUFRO World Congress, particularly, owing to the meetings with the brightest personalities, their presentations and insights, the festive atmosphere of the Congress, and the welcome by the leadership of host country. I, daresay, became a fan of this oldest global forest research organization. Upon return, it became evident that there was a need to rethink many things and it gave an impetus towards the preparation of the University for joining the family of world forestry research community as represented by the International Union of Forest Research Organizations. Soon, our Forest University became the third IUFRO member organization in our country.

The next 19th IUFRO Congress was held in 1990 in Montreal (Canada), and I purposeful sought to attend it as a member of the Soviet delegation, headed by Academician Alexander S. Isaev, who was the Head of the State Forestry Committee of the USSR at that time. Russian scientists submitted 45 papers for the Congress, and one of them was the paper, prepared jointly by Professor S.N. Rykunin and me for Division 5: *Forest Products* and I presented it at a section meeting. At the Congress, I met other colleagues from Division 5 whom I had known only through their publications. Those were Rolf Birkeland from Norway, M. Kellog from Canada, R. Juvonen from Finland, Anders Gronlund from Sweden, and Walter Liese from Germany. The Coordinator of Division 5 was Professor Robert L. Youngs whom I had met at the previous Congress. Unfortunately, my participation was limited, but I would like share some impressions about the Congress. One of the most impressive speeches was the short but very eloquent address of IUFRO President Robert E. Buckman about forest research globalization which set the keynote and direction for the Congress. The audience was very impressed with presentations of Academician A.S. Isaev and Professor N.A. Moiseev about the situation in the Soviet forest sector and main vectors of the Soviet forest policy.

Among the Congress participants, speakers and delegates, there were many people whose names were familiar to me but whom I met for the first time. Later, some of them had great influence on my future research and became our counterparts in future cooperation. As regards the speakers at the Congress, it was for the first time that I saw:

– Don Koo Lee from the Republic of Korea: later, he became a Vice-President and then the President of IUFRO. He is very responsible, tactful and friendly regardless of ranks and positions. I met him many a time during IUFRO events, welcomed him at our Forest University on different occasions, including the award of the title of the Honorary Doctor of the Moscow State Forest University to him in 2007;

– John Innes, representing the United Kingdom at the time, and then working in Switzerland. Now, he is the Dean of the Forestry Faculty (University of British Columbia, Canada). I came to know him better at the meeting of the IUFRO Management Committee, hosted by VNIILM in 2003; then, in 2005 (Brisbane, Australia) at the IUFRO World Congress when he was elected the Vice-President of IUFRO; and at the IUFRO World Congress in 2014 (Salt Lake City, USA);

– Risto Paivinen from Finland, who is the Director of the European Forest Institute/EFI (our Forest University is a member of this organization); he visited our country many times; we also met repeatedly in different countries; and in 2010, he visited our University;

– Margarida Tome from Portugal, whom I met many times on different occasions, including IUFRO events and Congresses, e.g., both of us took part in the session of the IUFRO International Council during the Congresses in Seoul in 2010 and Salt Lake City in 2014.

The earlier mentioned familiar scientists who were there include: Alexandr Alexandrov from Bulgaria, Walter Liese and Max Krott from Germany; Adolf Priesol from Czechoslovakia, Risto Seppala from Finland, Birger Solberg from Norway; Lisa Sennerby Forsse from Sweden; Richard Szimani and Howard Rosen from USA, Dusan Mlincek, Vlado Hitrec, Marian Breznjak, Stanislav Sever from Yugoslavia and others. Our meetings and friendship were very conductive to further development of international contacts, especially, along the line of IUFRO.

During the Congress, Vladimir Chuenkov from Russia, Niels Elers Koch and Andras Winkler were elected members of the IUFRO Executive Board. Later, Andras Winkler became the Rector of the University of Sopron, we met at many conferences, and our Universities have developed good relations. Unfortunately, due financial constraints, I could not participate in the extensive excur-sion program, demonstrating the North American forestry. At the same time, the participation in the Congress helped me to understand IUFRO's activities, build up my professional capacity and skills.

The next, 20th IUFRO World Congress took place in Tampere, Finland, in 1995. Owing to the political developments and the turn to openness in our country, and, perhaps, also owing to the neighbourhood of the host country of the Congress, there were many participants from Russia. Our Forest University sent a big delegation, headed by its Rector A.N. Oblivin. The Russian representation at the Congress was quite high and included 66 papers and memberships in steering bodies of IUFRO. V.K. Teplyakov was elected a Deputy Coordinator for Division 4, and V.V. Strakhov became a Member of the Executive Board from Eastern Europe (both of them are our alumni). At a section meeting of Division 6, I reported about the work of the Institute of Forest Systems Research which is part of the MSFU.

The Congress resulted into further development of contacts with colleagues from:

– IUFRO headquarters (they were always very friendly and open for collaboration, and it would have been impossible to publish this book without their aid): Heinrich Schmutzenhofer, Renate Prueller, Gerda Wolfrum; Anatoly Z. Shvidenko from the International Institute for Applied Systems Analysis in Laxenburg, Austria (we kept communicating on a regular basis and our collaboration included cordial meetings and joint publication of a book);

– Croatia, the Faculty of Forestry of the University of Zagreb: Vlado Hitrec, Marian Breznjak, Stanislav Sever (old friends since the 1986 Congress in Yugoslavia);

– Denmark, the University of Copenhagen: Niels Elers Koch (a good friend since my first contact with IUFRO; at the Congress, he was elected the Coordinator for Division 6);

– Finland: Timo Karjalainen (cooperating with Russian scientists, including those from the Moscow State Forest University, for a long time; later: a Nobel Laureate), Matti Palo (I had known his scientific publications very well), Risto Paivinen (who cooperated with our University in his capacity of the Director of the European Forest Institute/EFI), Hannu Raitio (later, we met on many occasions and signed an agreement in the Finnish Embassy in Moscow), Risto Seppala (later:

IUFRO President; I had met him at previous Congresses, he was the Chair of the Organizing Committee, and was elected a Vice-President of IUFRO), Birger Solberg (a former official of the EFI, elected a Member of the IUFRO Executive Board, repeatedly met at different meetings);

– France: Xavier Deglise, Bernard Roman-Amat, and Gerard Buttoud who continue to cooperate with our University;

– Germany: Walter Liese and Max Krott;

– Hungary: Andras Winkler;

– Korea, Republic of: Don Koo Lee;

– Norway: Rolf Birkeland;

– Portugal: Margarida Tome;

– Slovakia: Marian Babiak, Jan Ilavsky, Jozef Kolenka, Ladislav Paule, Adolf Priesol and Jan Tucek (old friends from Zvolen);

– Sweden: Anders Gronlundf and Lisa Sennerby Forsse;

– Switzerland (at the time of Congress): John Innes;

– USA: Richard Szimani and Robert L.Youngs;

– Yugoslavia: Petar Todorovic.

A meeting and discussions with Howard Rosen, an old friend of our University, resulted into his invitation to cooperation, and, later, my election as a member of the Society of Wood Science and Technology.

We were impressed with the high level of the host country's representation: at the Opening Ceremony, Paavo Lipponen, Finnish Prime-Minister, welcomed the audience; the diversity and high level of presentations and speakers, including those from Russia; very efficient work of the Organizing Committee, headed by Risto Seppälä who was elected a Vice-President at that Congress; there was also a very picturesque 'inside event' – an excursion with warm and informal talks; an interesting and rich exhibition program; and, most importantly, fruitful communications with colleagues from different countries.

The next Congress I attended was the 22nd IUFRO World Congress in Australia Brisbane in 2005. Our country was represented there rather modestly with most delegates being from the university sector. I participated in the Congress as the International Council Representative from Russia and it was conductive to further development of the relations between our University and already familiar IUFRO leaders: Risto Seppälä, IUFRO President (Honorary Doctor of our University by that time); Don Koo Lee, newly elected President of IUFRO; John Innes and Niels Elers Koch, Vice-Presidents of IUFRO; and Gary Bacon, Head of the Organizing Committee. Just a year before the Congress, we had met at the meeting of the IUFRO Management Committee, hosted by VNIILM in Pushkino, Moscow Oblast.

As regards the presidential discussion under the heading *Research to Cope with Global Change*, I was very impressed with the presentation, made by Peter Mayer, IUFRO Executive Secretary, on the global situation and recent changes in forest research. It prompted me, to some extent, to explore and assess the trends in international forest research, and enabled to expand our relations with IUFRO as well as to meet and communicate with Dr. Mayer.

The Congress gave another chance to see my old friends and colleagues and meet new ones, as well as to continue communications, trace familiar authors of presentations and reports, and identify scientists with proactive and current views in global forest science, whom I met again later.

The next, 23rd IUFRO World Congress was hosted by Seoul, capital of the Republic of Korea, in 2010. It surpasses all previous Congresses in the number of its participants. There were 20 participants from Russia, with three of them, representing our University.

Professor Victor G. Sanaev, Rector of the Moscow State Forest University, was invited to

attend the Congress personally by IUFRO President Don Koo Lee, who was a Honorary Doctor of the Moscow State Forest University; and we appreciated very his special care about us in spite of his heavy workload during the Congress. Another very supportive circumstance was that at that time, Dr. V.K. Teplyakov, one of our successful alumni, worked in the Seoul National University and helped us much – as an old friend and colleague - during the stay in Seoul. The level of our participation also benefited from the active involvement of our University in IUFRO work: by that time, our University had put in place and headed the Association of Russian IUFRO member organizations; it had initiated, commenced and presented at the Congress the project to develop and maintain the Russian segment of the Global Forest Information Service (GFIS-Russia). It should be noted that right after the Congress in Australia, this initiative had been supported by Don Koo Lee, IUFRO President, Ho Sang Kang (he had had a postdoctoral programme in our University a few years before the Congress), Peter Mayer, IUFRO Executive Secretary, Eero Mikkola, Global GFIS Coordinator, and other collea-gues. Without their friendly support, it would have been impossible to achieve the progress, praised by Dr. N. E. Koch during his visit to our University. I represented the Russian Federation at the meeting of the IUFRO International Council which approved the decision to make Dr. Niels Elers Koch the President of IUFRO, and made the decision on the dates and venue for the next Congress.

The Opening Ceremony of the Congress was rather impressive: the Congress participants were welcomed by Lee Myung Bak, President of the Republic of Korea. The audience was also addressed by Jan McAlpine, Director of the Secretariat of the UN Forum on Forests, who spoke on behalf of the UN Secretary General, Eduardo Rojas-Briales, General Director Assistant who spoke on behalf of the UN FAO, and other high-standing officials. The invited keynote speakers included Ko Un, a famous Korean poet, who presented an impressive 'prayer' for forests; Elinor Ostrom from the USA, Nobel Laureate of 2009 in Economics, Professor of Political Sciences, who made an interesting and emotionally charged presentation on the potential role of communities in sustainable forest resources. Other keynote speakers were: Frances Seymor, Director General of the Centre for International Forestry Research/CIFOR who made a presentation on *Forests, climate change, and communities: making progress up the learning curve*; Jose Joakin Compos Arce, General Director of the Centre for Agriculture Tropical Research and Higher Education/CATIE who highlighted the need for radical change in the views of the world environmental issues; Peter Shaw Ashton from the UK who talked about the disastrous situation with tropical forests (the presentation was called: the *Disastrous Trajectory of the Rain Forests: Research Imperatives*).

As expected, most plenary and inter-plenary sessions, setting the tone and focus for the Congress, were related to global environmental and social issues. It testified to the concern of the global forest research community about the situation in the world. The research focus of the agenda and presentations was reflected in the decisions of the Congress; and, first of all, in the adopted Resolution and IUFRO Strategy for 2010-2014. Those thoroughly prepared documents were impressively broad-scaled.

The last, 24th IUFRO World Congress was held in Salt Lake City, Utah, USA in October 2014. Its title was: "Sustaining Forests, Sustaining People: The Role of Research". The Congress was attended by about 4,000 scientists and experts, including 2,492 delegates from 105 countries, with 700 of them being university students.

At the stage of abstract submission, the Organizing Committee had received 3,777 abstracts of presentations and posters. It was for the first time that the Organizing Committee decided to provide detailed information about all accepted abstracts, which was right. It enabled participants to select relevant sessions to attend.

As expected, most plenary and sub-plenary sessions, setting the tone and focus for the Congress, were again related to global environmental and social issues to emphasize the concern of

the global forest research community about the situation in the world. The thorough selection of presentations for the plenary and sub-plenary sessions was praiseworthy. Owing to the efforts of the Scientific Committee under the leadership of Dr. John A. Parrotta, the presentations were of immense interest.

The research focus of the agenda and presentations was reflected in the decisions of the Congress; and, first of all, in the adopted Resolution and IUFRO Strategy for 2015-2019: *Interconnecting Forests, Science and People*. Those thoroughly prepared documents were, as usual, impressively broad-scaled.

It is noteworthy that before that Congress, the Moscow State Forest University had prepared and published *the History of the IUFRO Congresses and Russia* in two volumes, the authors are V.K. Teplyakov and V.S. Shalaev (Тепляков В.К. и Шалаев В.С. «История съездов ИЮФРО и Россия»). The idea of and work at the book were supported by many leaders and officials of IUFRO and our friends and colleagues from more than 20 countries. It is that support and help which enabled us to complement the book with this Chapter (*Words about IUFRO*), containing recollections of those who directly participated in IUFRO activities and events. These recollections and views were shared by the key actors of the international forest research community specifically to be included in the book. The delegation of the Moscow State Forest University delivered over 20 copies of the book to the Congress and we had an opportunity to hand them over to many of our friends, colleagues and assistants. It was very pleasant to see their friendly and approving attitude to the published book though it was only in Russian. It was suggested that it should be published in English as well. Later, about 100 copies of this two-volume book were sent to foreign and Russian addresses. The positive feedback and peer reviews encouraged us to publish the 2nd edition of the book.

In conclusion, I would like to stress that IUFRO is, indeed, a major international organization, uniting the forest research community. It brings together the most active, productive and reputable research people, defining the status, progress and focus of forest research in the world. This may be confirmed with a chronological analysis of their participation in IUFRO activities and career growth. Participation in the IUFRO Congresses helps to broaden the scope of mind, gain additional knowledge and build up research capacity. It also contributes to the country's positioning in the international research community. To enhance its integration into the global research community, Russia should take into account the achievements and outputs of the International Union of Forest Research Organizations and draw from them for the benefit of its national forest science.

Chapter 32
International Voices

Reflections on the relations between IUFRO and Russian Forestry 1977-1981

By Prof. em. Dr. Drs. h.c. Walter Liese
Hamburg, Germany
IUFRO President, 1976-1981

When elected as President of IUFRO at the XVI World Congress 1976 in Oslo, it was one of my goals to widen its international reach. So far, most activities had occurred in Europe and North America under the Presidencies of Julius Speer (1962-1967), Georg Jemison (1968-1971) and Ivar Samset (1972-1976). Being born in Eberswalde, the foundation mark of IUFRO, in a forest scientist family, IUFRO had been known to me for a long time. My early scientific work gave me possibilities to visit a number of countries, also behind the Iron Curtain to "internationalize" the cooperation in forest science.

In 1975, I participated in the International Botanical Congress, Leningrad, to become acquainted with Professor Ivan S. Melekhov, fostering also the translation of his standard book Waldtypology (Forest Types) in our institutional Publications Series. It was also the first contact with Dr. Nikolai A. Moiseev, Director of VNIILM, Pushkino. A good understanding developed with the Director of the Botanical Institute, Leningrad Forest Technical Academy intensified by a 10 months cooperation with their Dr. Alexander Frolov in my institute, Hamburg, leading to a relevant paper. This earlier contact to Dr. Moiseev was stabilized at the XVI IUFRO Congress 1976, Oslo, by his election as a President's Nominee for the incoming Executive Board, followed by his reelection at the XVII Congress 1981 in Kyoto. He represented the USSR also in the International Council, with Dr. Imant K. Ievin as Deputy.

Beneficial for the closer contacts was also the participation of 9 colleagues from Russia at the IUFRO Centennial, Eberswalde in 1992, to them I could show some historical details.

The growth of IUFRO during this period may also be documented by the increase of member countries from 82 to 93, with 7 from "East Europe".

Meetings of the IUFRO Executive Board are key events to discuss the program and also to learn about the forestry situation of the host country and the region. So, the next EB conference was held in Ibadan and Benin City, Nigeria, 1977, as the first meeting in a developing country, and in Africa as a new continent in the IUFRO geography. It could be prepared during an FAO mission July 1969 and a Wood Preservation project by the German Government, 1976, followed by IUFRO Workshops and Consultancies in 1977 and 1980.

This last Board Meeting during my term was significant as the first in a socialistic country. It was held 13-22 September 1980 in Moscow, and followed by the Forest Research Institute, Sochi. The key address was given by Minister Georgiy I. Vorobyov with the attendance of Dr. Ivan S. Melekhov, Dr. Leonardas A. Kairyukshtis, Dr. Alexander S. Isaev, Dr. Victor S. Kholiavko and D.V. Lazdan. Our intensive discussions had great importance for the coming World Congress as also for IUFRO's future. Accordingly, the further cooperation with the socialistic countries was intensively discussed and a congress in their region was planned. An important signal was the consideration of the President to be elected for 1982-1986. Among the possible countries, Yugoslavia was considered as one between the "blocks" to be a good solution for the 18th Congress. Consequently, their Forestry

Faculties were visited, resulting in a proposal for Prof. Dr. Dusan Mlinsek, University Ljubljana, whose Presidency was to be followed by Dr. Robert Buckman (1987-1990) and Dr. Salleh Mohd Nor, Malaysia, to set a sign for Asia.

Noteworthy to mention was the good understanding between all participants, also with sorrow feelings about our political separation. As a sign of our unique forestry roots, the Director of Caucasian branch of VNIILM ,Victor Kholiavko, honoured me during a home celebration for the birth of his granddaughters, Natascha and Katja, to become their godfather! For quite a time we could keep contacts, but communications became than difficult by the political changes.

Further projects in Forest Science with IUFRO were discussed later (1-7 August 1989) during a research project on "Oak decline" in Moscow/Pushkino with Dr. N.A. Moiseev and in Volgograd with the Deputy Director of All-Union Institute of Agro-Forest-Amelioration Professor Helmut Ya. Mattis.

In all discussions, my main partner was Dr. Nikolay Moiseev, Director of VNIILM and Professor of Moscow State Forest University. His masterpiece on "Forest of Russia: problems and decisions", Moscow, 2010, 632 pages, should be considered as the most important information for all related discussions.

About IUFRO my word

By Dusan Mlinsek
Professor Emeritus, Ljubljana, Slovenia
IUFRO President, 1982-1986

I began my activities in IUFRO more than 50 years ago at the IUFRO Congress in Vienna as a member of a Working Group 21 dealing with forest tending measures within Section 23 on Silviculture. That was nice time when I have been working with many interesting people such as professors H.Pechmann, F.Hummel, M.Migroet, G.Hellinga and others. After reorganization, since 1971, I was a head of Division 1 dealing Forest Environment and Silviculture and a member of Executive Board of the Union. In Norway, I was re-elected for these positions for the second term. That was a very challenging time as we opened new page in IUFRO history after reorganization made in Gainesville, USA.

When I was elected as IUFRO President, much was done by my predecessors, and IUFRO became a big internationally recognized organization. The time was a complex era of mass forest and the environment destruction, so, the forestry and timber industry entered in a new period, and it was true for research work.

At that time, much attention was paid to the processes of losing forest cover, our renewable natural resources, especially in tropics due to development and energy crisis. Surprisingly, not much attention was paid to the Northern forest, what we call boreal forests, although, they are vulnerable due to severe climatic conditions and hard regeneration process. One of my proposals as a President-elect was to enhance the development of research in temperate and boreal forests most of latter are in the Soviet Union. That was based on common logic for comparative research of vegetation by natural belts. I was glad to learn that in 1990-s a new network has emerged that was International Boreal Forest Researchers Association. I think that is good because many boreal forests researchers were from IUFRO member organizations.

One more issue that still exists is "waste lands" or man-made deserts. We tried to change people and politicians attitude toward better use of our common treasure – land, water and forest – keeper of land, water and air quality that resulted in Rio Conference in 1992 documents, sorely, without forests as key issue.

IUFRO became stronger since our research work has been turned into the practice, especially in developing countries. I am glad that SPDC – Special Programme for Developing Countries was established during my term as a President. This Programme became a loco for the development of small research institutions in less developed countries. I do not know, how things are going now, but still I think that bigger institutions in developed countries have better and more sophisticated equipment than other. This is also a task for the future cooperation development. That was my belief that IUFRO should support the small institutions.

I hope and wish IUFRO to have a good future for benefiting both people and forest, the nature at large!

IUFRO, the US and the Soviet Union

By Robert E. Buckman[309]
Professor Emeritus, Corvallis, OR, USA
IUFRO President, 1987-1990

The 45 years following World War Two were a time of major tension between the East and West, with the Soviet Union and the US major players in this discord. My participation in these affairs, while small in the overall scheme of things, stemmed from two sources. The first was my appointment in 1975 as Deputy Chief for Research in the U.S. Forest Service, with leadership responsibilities for 950 scientists working in broad areas of forestry research in the US. The second was appointment in 1976 to the IUFRO Executive Board, followed by election as Vice President in 1981 and President in 1986.

As the years following WWII passed by, it became obvious to citizens of the World that the tensions between East and West had to be addressed. For the US and the Soviet Union a part of the outcome led to collaboration in forestry and agriculture. It was here that I became involved in formal governmental exchanges with counterparts, visiting USSR several times in this capacity. The governmental exchanges were more formal and at times contentious than those involving IUFRO, although the same people were often engaged in both. As a side note I was impressed by how similar were the forests of the Soviet Union were to those that I knew early in my career in Northern North America.

These exchanges brought me into contact with Dr. Nikolay Moiseev, Director of the largest Forest Research Institute in the USSR headquartered in Pushkino adjacent to Moscow, then Dr. Alexander Isaev, Head of the USSR Forest Committee, and later on - with Victor Teplyakov, Head of the national research program in the Russian Forest Service with whom I met several times in the US and at IUFRO events in later years. It was said that Victor and I headed the two largest forestry research groups in the world, a point I readily conceded to him, since the socialist system his country employs far more of its countrymen in government work.

I became aware of WWII and East/West sensitivities within IUFRO almost as soon as I became a member of the Executive Board. Then IUFRO President Walter Liese deserves special credit for his role on in bridging potential animosities among former wartime adversaries. He guided leadership appointments on the Executive Board and in scientific working groups both East and West that hastened this recovery. In 1980, President Liese convened an IUFRO Executive Board meeting in Sochi in the Caucuses region of the Soviet Union. It is a region that experienced some of the most brutal battles of WWII. In my view that EB meeting created an environment for ever

[309] It is sad to realize that Robert Buckman is no longer with us (28.06.1927-02.04.2016).

increasing interaction between the Soviet Union (and after 1990 Russia and the Commonwealth of Independent States) that persist to this day.

Relationships with developing countries, and with South American and Asian countries, captured more time during my Presidency than East/West problems. Still, during that time we planned an Executive Board meeting with a split venue (between Vienna and Prague) across the "Iron Curtain", with the intention of reaffirming the non-political nature of the Union. Similarly, the Centennial anniversary of the Union, to be held in Eberswalde, East Germany in 1992, had its initial planning during my Presidency. Ironically, the cold war ended about 1990, and with it many of the problems that here-to-for seemed so difficult. I am pleased that relationship between Russia and American foresters especially on boreal forests issues rapidly developed – forest fires, forest pest control, forest management practices, and many others.

IUFRO: Recollections of a President

By Dr. Salleh Mohd Nor
Kepong, Selangor, Malaysia
IUFRO President, 1991-1995

I have always considered my election as President of IUFRO in August 1990 at Montreal Canada, as one of the highlights of my career. As the first IUFRO President from outside Europe and America in 100 years history of IUFRO, I truly consider it an honour and a privilege to be elected as President of this global body. I would like to thank Professor Dr. Walter Liese from Hamburg, Germany, who was IUFRO President then, who first introduced me into IUFRO and invited me to become a member of IUFRO as Member from the Western Pacific. That was in 1980. I was elected Vice President in 1985 and finally President in 1990 and remained on the Board as Past President until 2000. Thus, my involvement in IUFRO spanned a period of 20 years! I must thank the Executive Board then for their trust in me and the Government of Malaysia and Board of Forest Research Institute of Malaysia (FRIM) for approval and support.

One of the foremost concerns I had when I became President was the low prestige and support of forestry research in developing countries. The lack of political support and funding and lack of qualified human resources are major barriers to effective research in these countries, with very few exceptions. Leadership and proper research management also were lacking. Thus, I was pleased and grateful to the Forestry Department of the Food and Agriculture Organization (FAO) of the United Nations, who were spontaneous in the support. This resulted in the Special Programme for Developing Countries (SPDC) that started and developed training programmes for researchers from developing countries.

The Special Programme for Developing Countries (SPDC) had the financial support of the World Bank through the efforts of Dr. John Spears and other donors including the U.S. Forest Service and the United Nations Development Programme (UNDP). The late Dr. Oscar Fugalli, formerly from the FAO, became the first coordinator. It developed various programmes to help develop human resources in research in developing countries, especially in Africa and Latin America. Dr. Brian Payne from U.S. Forest Service succeeded Dr. Oscar Fugalli after the later retired.

In Asia, we developed Asia Pacific Association of Forestry Research Institutes (APAFRI) with the support of the late Dr. Y.S. Rao from the FAO Regional Office in Bangkok. Dr. Rao was supportive of forestry research and we worked together to hold a number of meetings and seminars of heads of forestry research in Asia. This finally led to the formation of APAFRI, based on its sister organization, Asia Pacific Association of Agriculture Research Institutions (APAARI). I was the

inaugural Chairman of APAFRI until I retired from FRIM in 1995. I am pleased to inform that APAFRI still exists today with Dr. Sim H.C. being the Director and located at its permanent home on the FRIM grounds in Kepong, just outside Kuala Lumpur, in Malaysia. APAFRI is currently sponsored by the FRIM Board, the Malaysian Forestry Research and Development Board.

It was also during my tenure as President of IUFRO that Centre for International Forestry Research (CIFOR) was conceived. I was a member of the Consultative Group on International Agriculture Research (CGIAR) when the idea of establishing CIFOR was first mooted and I was involved in the numerous meetings that finally led to the formation of CIFOR. I was a member of the inaugural board of CIFOR, established in Bogor, Indonesia.

It was during my tenure as IUFRO President that I was invited to become a member of the CGIAR (formerly the *Consultative Group on International Agricultural Research)*, an umbrella body that funds research within 15 international research centres under the CGIAR covering various crops such as rice (International Rice Research Institute in the Philippines), Biodiversity International, CIFOR, International Food Policy Research Institute (IFPRI), International Institute for Tropical Agriculture (IITA). International Livestock Research Institute (ILRI), International Maize and Wheat Improvement Centre (CIMMYT), International Potato Centre (CIP), International Water Management Institute (IWMI), World Agroforestry Centre (ICRAF), World Fish and others. I had the opportunity of visiting some of these centres and being briefed on their programmes. The CGIAR system spends a lot of money to support these organizations, but I am not sure of the outcomes of all the research that are being undertaken.

During my Presidency the IUFRO Board decided to hold in 1992 the Centennial celebrations in the birthplace of IUFRO in Eberswalde, then in East Germany. However, much to our relief, Germany was reunited as one Republic of Germany and our task was made easier, and the celebration was successfully held at an old monastery in Germany with the help of Prof. Dr. Walter Liese. As a result of my 20 years involvement in IUFRO, I was able to travel to all the four corners of the globe, visit many forestry research institutions and meet many researchers as well as political leaders. I made friends that still last to today from all over the world.

IUFRO has definitely provided me with the most interesting and rewarding experience of my professional career and my life, for which I am most grateful to all that had supported me, especially Prof Dr. Walter Liese, the then Secretary to IUFRO Dr. Heinrich Schmutzenhofer of Vienna, Dr. Robert Buckman, Past President from USA, and all past IUFRO Board members and friends that are too many to name, for their friendship.

A tribute to Russian forests and foresters

By Professor Jeffery Burley
Director-Emeritus, Oxford Forestry Institute, UK
IUFRO President, 1996-2000

In addition to having one of the world's greatest resources of forests and forest products, Russia has a long history of forest management, research and education. The forestry school in Leningrad was world famous for two centuries and its library was one of the libraries of deposit for the world's forestry literature, along with the library at the Oxford Forestry Institute. Several Russian foresters were seconded to developing countries to assist their forestry sectors and many foresters from those countries were educated in Russia.

Largely because of difficulties with language, much of the progress in Russia was not widely appreciated in other countries; relatively few Russian foresters and researchers took part in

international activities such as those of IUFRO, although one senior Government official was always appointed to the Executive Board of IUFRO and made significant contributions to the Board's policy discussions.

Recently several successful meetings of IUFRO research units and committees have been held in Russia and provided considerable mutual benefit and awareness for all participants. Now, in the 21st Century, we have enhanced international transport and communication, the development of new forms of information sharing, and the expansion of national and international awareness of forest-related issues; Russia will have great opportunities for participating in global debates, research collaboration and sustainable forest development.

Memories on my Russian IUFRO connections

By Risto Seppälä
Professor Emeritus, Helsinki University, Finland
IUFRO President, 2001-2005

I have had permanent professional connections to the Russian research community since 1974 when I hosted a Russian forest scientist who visited Metla (the Finnish Forest Research Institute) for a couple of months. The connections were intensified when I became the leader of the Forest Sector Project at IIASA (International Institute for Applied Systems Analysis) in Austria in 1980. The Soviet Union was one of the major collaborators in the project, and a good number of Russian forest scientists visited IIASA during the two years I was leading the project.

My first formal IUFRO-related connection to the Russian forest research community is from the year 1981. The IUFRO World Congress was then held in Kyoto, Japan, and there I became a coordinator of an IUFRO Project Group on International Trade in Forest Products. Because I wanted to have one of my Deputies from the Soviet Union, I approached during the Congress Professor Nikolay A. Moiseev and asked him to nominate a proper person. He gave an immediate answer, and the person he mentioned was next day elected to the post. Because he did not participate in the Congress, he probably learned about his nomination only after the Congress. We never met during the term, but anyway, another bridge to the Russian research community was created.

In the 1980s and early 1990s, I met many Russian researcher colleagues in different international meetings but new close IUFRO-related connections had to wait until the Tampere World Congress, which was held in 1995. Because I was chairing the Congress Organizing Committee, my pleasant obligation was to learn to know as many participants as possible. The Russian delegation was one of the largest, and therefore, I got many new Russian friends. From the participants I recall the names Alexander S. Isaev, Alexander N. Oblivin, Nikolay A. Moiseev, Anatoly P. Petrov, Anatoly I. Pisarenko, Valentin S. Shalaev, Valentin V. Strakhov and last but not least Victor K. Teplyakov. Later on, I have met and collaborated with all these persons, often in IUFRO-related business.

The next milestone in my relations to the Russian forest research community was when I was awarded the Honorary Doctorate at the Moscow State Forest University in 2002. Then I met again Rector A.N. Oblivin and practically all my best Russian colleagues. I was treated very well, not only during the ceremonies, but also before and after. Among other activities, Victor Teplyakov and his colleagues took me to a Russian banâ (sauna). It was hot even in Finnish standards, but I survived with the help of a pool filled with ice-cold water and a big glass of excellent Russian vodka.

Connected with the doctoral inauguration I learned to know at the Moscow State Forest University also some representatives of the younger generation. One of them was Natalya A.

Vinokurova who was responsible for the practical arrangements of the inauguration ceremonies. Afterwards she visited Finland several times and was involved in IUFRO activities to establish a group on intercultural communication. Natalya and Olga Sidorova, a young and promising dendrochronologist from Krasnoyarsk, whom I learned to know later, received an IUFRO grant to attend the Brisbane World Congress in 2005.

In 2003, the IUFRO Management Committee met in Moscow, for the first time in history in Russia, and was generously hosted by our local colleagues. In addition to our own gatherings, we had an opportunity to meet with Professor Victor G. Sanaev, the newly appointed Rector of the Moscow State Forest University and some high-level Russian authorities including Head of the Russian Forest Service Valerij P. Roshchupkin whom I knew from earlier appointments concerning Russia's plan to have a IUFRO World Congress in Moscow.

IUFRO has been lucky to have excellent Board members from Russia. The most recent ones are Victor K. Teplyakov who was in the Board in 2001-2010 after serving several years in Division 4, and Elena G. Kulikova who is currently a Board member. I have had excellent collaboration with Victor and Elena, and not only within the IUFRO frame. Victor was a member of Metla´s SAB (Scientific Advisory Board) when I was chairing it. Elena and I were at the same time members of the SAB of EFI (European Forest Institute), and also Victor has been an EFI's SAB member.

I have really enjoyed my IUFRO-related collaboration with Russian colleagues. Many of them are not only colleagues. They are also good friends. It is said that Russians have a big and warm heart. Via my Russian colleagues and friends, I can verily confirm this.

Relationships and few opinions for IUFRO

By Don Koo Lee
Professor Emeritus, Seoul National University
Seoul, Republic of Korea
IUFRO President, 2006-2010

I have first learned about the activities and functions of IUFRO from Professor Sin Kyu HYUN in 1967 during his class on forest genetics and tree breeding. When Professor Hyun had a trip to a natural stand of *Pinus koraiensis* at Mt. Sorak in 1969 to prepare his paper on pine blister rust resistance breeding to be presented in the IUFRO Working Party meeting, I was with him to accompany and help him. Later he became my advisor for MS thesis.

My first time to participate in the IUFRO World Congress was in 1981, which was held in Kyoto, Japan. I presented the paper entitled, "Characteristics related to pine gall midge attack in resistant or susceptible to *Pinus thunbergii* and *Pinus densiflora*". At that time, I was so impressed with such a huge scientific international meeting for a week, followed by post-Congress tours. A lot of well-known forest and related scientists and young or old researchers were gathered together to discuss deeply on their interested topics.

My interest to IUFRO grew deeper as I attended the IUFRO World Congresses held in different parts of the world. The 1995 Tampere World Congress in Finland and post-Congress tour to St. Petersburg was an excellent one. St. Petersburg was so beautiful with amazing old palaces, museums, a great memorial for Pushkin and forests of scotch pine and larch. The 19th IUFRO World Congress in Montreal, Canada was attended by some Korean foresters who joined also the post-Congress tour to the sites of maple sap collection and Jack pine seed collection and storage. The centennial celebration of the IUFRO held in Eberswalde, Germany in 1992 still deeply lingered in my memory.

I started to work in IUFRO first as an IUFRO Board member called “President Nominee (PN)” in 1996 to 2000. I assisted IUFRO President Jeff Burley in my capacity as PN. During the period 2001-2005, I served also as Vice-President for Policy wherein I dealt much on the policy issues of IUFRO. Becoming Vice-President for Policy was due to Dr. Salleh’s strong recommendation as Immediate Past President in the Policy and Planning Committee of IUFRO before votes in the Enlarged Board meeting for selecting incoming President and two Vice-Presidents. My special thanks were given to Dr. Salleh for this. One of the challenges during this period was the difficulty of communicating with the General Board members who must work together to solve the challenging policy issues as most of them were involved in their own institutes or offices as heads. I was able to attend all Board meetings and Management Committee meetings, and even all Division 5 (Wood Products) meeting in 2003 in Rotorua, New Zealand.

As IUFRO President for 2006–2010, I can proudly say that I did my best in the development of IUFRO. In particular, much attention has been given to fundraising activities and more young scientists were encouraged to be involved in IUFRO. I have emphasized during my term the five I’s (invite, inform, involve, ignite, influence) for better communications and partnerships with IUFRO members and young people, especially IFSA. During this period, deep concern was given to the lack of expertise in forestry, particularly in developing countries. The same also goes for institutional support and development in forestry which have not progressed in pace with other fields. Meanwhile, strong advocacy for capacity building from collaborative research projects was also emphasized. Since research is the primary activity of member institutions, strengthening research groups in IUFRO was mainly undertaken. A network of information exchange among scientists around the world was also enhanced through conferences, symposia and workshops. Although IUFRO has been playing active roles in UNFCCC and UNCBD, not in UNCCD despite the fact that causes of land degradation are closely knitted to the loss/degradation of forests. There has been a lot of talk about biotechnology and nanotechnology on cellular levels. Moreover, there have been mushrooming plantations with fast-growing species including *Eucalyptus* and *Acacia* in Asia, Africa and Latin America, and there have been abusive use of chemicals in wood products causing new house syndromes. These are some of the challenges that brought changes on improving research globally.

Finally, despite the challenging tasks, I enjoyed working for IUFRO as a Board member (President Nominee, Vice President, President and Immediate Past President) for 19 years. I have allocated about 80% of my daily time schedules to work for IUFRO during my presidency. Of those responsibilities for the IUFRO President, personal relationships with the members and the Secretariat were most important and must be strengthened for the sustainable development of IUFRO. I have received an honorary doctoral degree from Moscow State Forest University in 2007 being the IUFRO President at that time. My sincere thanks should be given to the Moscow State Forest University Board and Rector Victor Sanaev. From another prospective, Professor Victor Teplyakov has made the exchanging bridge in forest sectors between Russian Federation and Republic of Korea. I am so delighted to have held the 23rd IUFRO World Congress with a great success in August 2010 in Seoul, Korea. I was also happy that His Excellency, Dr. Lee Myung-bak, President of the Republic of Korea had attended this Congress to deliver his congratulatory addresses. This success of the Seoul Congress paved the way for me to be appointed as the Minister of the Korea Forest Service for the period Jan 2011 to March 2013.

I hope that IUFRO will keep on growing in the future and will continuously address the emerging needs of the scientific community through forest science research. I hope IUFRO will invite more research scientists and policy makers to join IUFRO activities locally, nationally and globally.

My IUFRO-relations with Russian Forest Research during 1992-2014

By Professor Niels Elers Koch
Director General, Danish Centre for Forest & Landscape Research
Copenhagen, Denmark
IUFRO President 2010-2014

As newly elected Deputy Division Coordinator of IUFRO Division 6 (1991-1995) I took on the task to arrange a joint IUFRO meeting of Division 4 and 6 in Russia together with Dr. Nicolay Moiseev, Director of VNIILM, Pushkino. That was a very interesting and rewarding experience. The meeting took place 6-12 September, 1992 in Pushkino, Moscow Region, under the title "Integrated Sustainable Multiple-Use Forest Management under the Market System". About 60 leading forest economists and political scientists from 11 countries from outside of Russia and about the same number of forest scientists from within Russia participated, and the proceedings was published in English and Russian.

In 2003, I had the pleasure of coming back to Pushkino for a IUFRO Management Committee (MC) meeting being the Divisional representative in the MC as Coordinator of IUFRO Division 6.

In the 90'ties we had for several years a good cooperation with Saint Petersburg State Forest Technical University under the leadership of Rector Selikhovkin Andrey Vitimovich about Urban Forestry, and in November 2011, I as IUFRO President opened the conference about "Ecosystem Design for Multiple Services" at the very same university.

In January 2011, I had the great honour of being appointed Honorary Doctor of the Moscow State Forest University by Rector, Professor V.G.Sanaev, and in 2012 I had the pleasure of receiving a visit of professors and forestry students from the Moscow State Forest University at University of Copenhagen in Denmark.

So, all in all I have had many good experiences during many years of forest science and the rich culture in Russia, and the great hospitality of the Russian forest scientists. And I do hope to have many more in the years to come.

IUFRO reflections

By Dr. Michael J. Wingfield,
Johannesburg, South Africa
IUFRO President 2014-2019

It is always a great pleasure to reflect on my relationship with IUFRO, which has extended over more than 30 years. For me the beginning was being invited to participate in a IUFRO Working Party and that alone brought me into contact with amazing forest scientists who were able to provide great mentorship and guidance. One easily forgets how important this is to young scientists and I am sure that I could not have succeeded as well as I did without that first IUFRO connection. Being so impressed with IUFRO as an organization I began to become more involved at every level of the structure, becoming a Research Group Coordinator, a Division Deputy and later Coordinator, finally reaching my current position as Vice President responsible for IUFRO Divisions.

Via my long and most rewarding association with IUFRO I have been able to attend a great number of meetings worldwide, and thus also to meet and work with some wonderful people. This has in a great way promoted my scientific career and I know that the same is true for many other forest scientists. I have sadly not been able to visit Russia but certainly look forward to that opportunity and to making closer contact with my good Russian colleagues and friends. As I move towards assuming a higher level of responsibility as IUFRO President for the new term starting in

October 2014, I hope to be able to support all Forest Scientists strongly and this will certainly include those from Russia, where IUFRO's footprint should be much stronger.

Words about IUFRO

By Heinrich Schmutzenhofer
Vienna, Austria
Executive Secretary of IUFRO 1987-2003

If IUFRO would not exist, it would be a "must" to create it. That sentence derived often out of discussions at Congresses due to the conviction, shared believe, of important results and achievements on not only forest research related issues. IUFRO's structure enables researchers to coop in a closed shop, the "Unit" where research and personal friendship and international understanding often develops. The ties are long lasting, even if retired the colleagues remain in contact.

I say, IUFRO is the international network supporting research, individual friendships, and understanding among nations all within the scope to enhance sustainability in all branches of forestry to ensure human life.

In 1992 at Eberswalde, Germany, during our Centennial celebrations, The Assistant Director General of FAO, Mr. Hollis Murry formulated *IUFRO* as *the Advocate of Forest Science,* he exactly met the point!

IUFRO is exceptional, because it is the only world-wide international organization devoted to forest research and related sciences. Agricultural researchers often express enviousness when they come in touch with IUFRO conferences or meetings and state "we also would need such an organization".

The development of IUFRO since its foundation in 1892 showed us that personal contacts and the demand of support among scientists involved in forestry matters overcame all kinds of politics, political systems and wars. Individual input and friendships remained, helped to achieve prosperity on international level. Many examples exist; I will refer to two of those: The international larch provenience trial starting in 1941, with field testing in 1944. Many of the nations involved in the World War cooperated to realize the target. Belgium, Italy, Canada, Germany among others participated at that time. The second is the independence of IUFRO as a non-profit and non-governmental, voluntary and non-discriminatory Organization. There was in 1948 the desire to include IUFRO into the FAO part of the UN, a political organization. In that case we would have lost our political independence.

IUFRO's Structure has been always adapted to the needs born at the time. It started as the "Club of Directors" of Forestry Research Institutes, working languages were German and French. The directors had there usually annual Congresses and agreed to special research programmes and projects. After World War One, started in 1925 the work in IUFRO again, and in 1929 at the Congress in Stockholm, Sweden, the scope was enlarged: Universities were invited to join IUFRO and English was included into the official languages. Office holders were elected to lead the newly created Sections that means such tasks shifted from directors of institutions to staff members. The scope of research stretched towards the tropics and the Southern Hemisphere. After World War Two, all kind of researchers could join the newly established Research Units and contribute to independent, international cooperation. Finally, we got Spanish as the fourth working language at the Congress in 1990, Montreal, Canada.

I wish IUFRO the all best for a long lasting success! IUFRO Vivat, Crescat, Floreat![310]

[310] Long live, grow, flourish!

IUFRO and FAO

Dr. David A. Harcharik[311]
Waterford, Virginia, USA
Assistant Director-General & Head, FAO Forestry Department, 1995-1997
Deputy Director-General, FAO, 1998-2007

For longer than I can remember, a very close partnership has existed between IUFRO and the Forestry Department of the Food and Agriculture Organization of the United Nations (FAO). This partnership has been strong and mutually beneficial.

While strictly speaking, FAO is not a research organization, it makes great use of research findings in reporting on global, regional and local forestry issues, and it assists forest organizations, especially in developing countries, apply new knowledge to real life forestry and natural resource problems. Much of its work at the country level focuses on developing, through applied, on-site research, appropriate technologies for local conditions. FAO also has a long history of strengthening developing country forestry institutions, be they forest management agencies, research organizations, or educational institutions, which inevitably are involved in research.

In addition to being a user of research, FAO serves as an idea bank for needed new technologies, drawing from the situations encountered by its diverse staff posted across the globe. To me, then, the relationship between IUFRO and FAO has always been mutually beneficial, a kind of feedback loop, with FAO providing input to IUFRO on research needs while also putting into practice the output of IUFRO research.

One excellent example of the mutual interest of IUFRO and FAO is that of the Special Program for Developing Countries (SPDC). This IUFRO program endeavored for many years in the 1980s and 1990s to bolster the research work of developing country forestry institutions and to involve them more in the work of IUFRO. A retired career FAO forester, Oscar Fugalli, was a leading instigator of this program, and FAO cooperated closely with it. The SPDC is touched on elsewhere in this book.

Perhaps it is for this mutually beneficial reason that for several decades, FAO has been invited to serve as an *ex officio* member on the IUFRO Executive Board (EB). This is a privilege and responsibility that the Heads of the FAO Forestry Department have always accepted with utmost gravity. While I was the Head of that Department for three years in the 1990s, I had the honor to host in Rome one of the meetings of the IUFRO EB and to participate in other EB and technical meetings. Although the specifics of the many discussions which took place during those meetings have faded with time, and many of the personalities have gone in their separate directions, I maintain today the greatest respect and admiration for the scientists involved in IUFRO and for the contributions they make toward the better management of the world's forests and natural resources. And I hope that the warm, mutually beneficial partnership between IUFRO and FAO will continue and flourish for a long, long time.

Personal reflections and association with IUFRO

By Hosny El Lakany,
Adj. Professor, Faculty of Forestry, UBC, Vancouver, Canada.
Former Assistant Director-General, Forestry department, FAO, 1996-2005

Personal association with IUFRO. Looking back nearly fifty years ago, I recall my early days as a forestry student at the University of British Columbia, then as a young Egyptian forester trying

[311] It is sad to realize that David Harcharik is no longer with us (13.10.1943-03.12.2014).

to break into a conservative profession reserved exclusively to nationals of traditional forest countries. While it was possible to find a job in forestry research and settle in Canada those days, I felt that my newly acquired training would be relatively more useful to Egypt. That proved to be a gamble worth taking despite the advice from a classmate at UBC that "teaching forestry in Egypt is just like teaching birth control methods to nuns". Trying to teach forestry and do research in a Low-Forest Cover Country (more correctly a No-Forest Cover Country), I was lucky to be "adopted" by two organizations, the International Development Research Centre of Canada (IDRC) which provided me and my graduate students with research funds and IUFRO which provided me with international connections.

The best value of IUFRO for young forestry researchers, especially those from developing countries, is availing the opportunity to contact, interact, network and learn from the largest forestry research community in the world. Although I knew several researchers through correspondence and reading their research, it was the IUFRO World Congress in Oslo in 1976 that launched my close association with the Organization. I presented my research on breeding *Casuarina spp.* for drought and salt tolerance, which was appreciated by the community and led to the creation of a "Working Group" eventually. The Congress provided the best opportunity for me and other young researchers from developing countries to meet eminent scientists; some of them became among my mentors such as Walter Liese and Bob Buckman. Long lasting friendships were initiated in Oslo and pursued at the all the subsequent Congresses particularly with the IUFRO Presidents, management, member scientists and institutions.

IUFRO and FAO. The relationship between IUFRO and FAO started almost with the establishment of FAO Forestry Department. The areas of collaboration and results achieved are too many to account for here. I recall Jeff Burley once quoting one of my predecessors as FAO-ADG/Head of Forestry Department saying that: "IUFRO is the conscious of FAO Forestry". This has proved to be true over the years. It has been recognized that the FAO's development work needs a solid scientific foundation and that researchers need to have their feet on the ground through contacts with FAO professionals and fieldwork. The science-policy nexus has been guiding both organizations over many decades. IUFRO regularly attend in the Committee on Forestry (COFO), the FAO Statutory body for Forestry, and actively contribute to its discussions which is always appreciated by member countries and sister organizations. Similarly, many of FAO professional are members, and frequently act as Coordinators, of IUFRO Working Groups.

IUFRO and FAO always coordinate their major global events especially the IUFRO World Congress and the FAO World Forestry Congress. For example, there have been constant consultations among the two organizations and respective host countries on the themes of the Congresses. Both organizations participate in each others' congress and contribute to the discussions.

IUFRO and CPF. IUFRO has been recognized in the intergovernmental forestry discussions since the Rio UNCED of 1992, but with neither formal membership in the Intergovernmental Panel on Forests (IPF), nor in the Intergovernmental Forum on Forests (IFF). When the United Nation Forum on Forests (UNFF) was created in 2000, an accompanying resolution was to establish the Collaborative Partnership on Forests (CPF)[312]. As part of the International Arrangement of Forests (IAF), the CPF's overarching objective is to promote the management, conservation and sustainable development of all types of forests and strengthen long-term political commitment to this end as well as to support the work of the UNFF and its member states and enhance cooperation and coordination among CPF member organizations.

[312] UN ECOSOC Resolution 2000/35.

In appreciation of IUFRO's active participation in the IPF, IFF and UNFF processes and frequent contributions to the IAF as well as its close working relations with CPF members, CPF extended an invitation to IUFRO secretariat to its ninth meeting, held at FAO in Rome in 2003 as an observer. Risto Seppälä, the then IUFRO President, presented an overview of IUFRO activities that are most relevant to CPF and outlined the possible contribution of IUFRO to the International Arrangements on Forests at large and to the work of CPF in particular. CPF members noted with appreciation the possible contribution of IUFRO to the CPF and decided to extend an invitation to IUFRO to join the partnership. I consider this as a major achievement in my capacity as the first CPF Chair and one of the highlights of my career and association with IUFRO.

IUFRO has been an active CPF member and several joint activities have been undertaken in collaboration with other members in support of the IAF.

A 31-year participation in IUFRO activities. A 28-year involvement in the IUFRO Board

By Dr. Eric Teissier du Cros
Erquy, France
IUFRO Vice-President, 2001-2005

IUFRO, a world scientific network. My first contact with IUFRO could have been in September 1967 at the Munich World Congress, a few weeks after my appointment by the Forest Research Department of INRA, the French Institute for Agriculture Research. But I was kindly asked to stay "at home" because only old timers and generalists were able to participate in such an international event. I was then 23 years old and was definitely not old and skilled enough. As a first step into IUFRO, I eventually got older. I was asked to participate, in 1974 in Stockholm, in a meeting on forest genetics. Of course, I was impressed, but could listen to highly skilled geneticists, almost gods. However, I did not dare ask questions or take part in discussions. In spite of my shyness I was gradually starting to become a specialist.

In 1981, in connection with my own research program, I was asked to organize the scientific meeting of the Working Party on poplar genetics and breeding. I was then elected chairman of this working party. Quite exciting to be able to present results and dare ask questions to gods! In 1984, I co-organized in Ottawa, with FAO, a meeting on poplar breeding, improvement and culture, Canada.

IUFRO, an international family. In 1986, during the Slovenia IUFRO Congress I was introduced by my brother in law, Jean Pardé who was then coordinator of Division 6, into what appeared to be some kind of a family and also an excellent travel agent. In 1987, I became regional member in the Executive Board for west Europe under Bob Buckman's presidency. My first executive Board meeting was in Congo Brazzaville. Since I could speak both French and English, I was asked to translate the information provided by the local French-speaking manager of the forest research program, a person with outstanding humour. I laughed when I listened to him and laughed again when translating.

Gradually, I was asked to take part in the coordination of international scientific activities and events, first in Division 2 (Physiology and Genetics) and finally in 2001 as IUFRO Vice President "Science" under Risto Seppälä's presidency. I had now become a generalist. Among other, my activity included the coordination of the scientific part of IUFRO World Congresses in Canada 1990, Finland 1995, Malaysia 2000, and Australia 2005. I had then become an old timer and received IUFRO's Distinguished Service Award in 2005 after the Australia World Congress. In 2010, after my retirement, I was invited to the Republic of Korea IUFRO Congress and became Honorary

Member. This last distinction was a huge honour for me because only three French scientists had received it before me: Philibert Guinier in 1953, Auguste Oudin in 1976, and Jean Pardé in 1982. I was very proud to have reached the same distinction as my mentor's, Jean Pardé, the one who had introduced me in the IUFRO Executive Board in 1986.

During these 28 years in IUFRO, I was able to take part in scientific and coordination meetings in about 30 countries of all continents. They were all organized in the best possible way and allowed everyone discover forests and forest research programs in a large sample of political and environment conditions. One of these meetings, the 2003 Management Committee meeting, was organized in Pushkino near Moscow, Russia, by the excellent Viktor Teplyakov: my first visit to this huge and mythic country. I was impressed by the hospitality of our hosts and the amazing suburban and town traffic that lead our group to discover the outstanding underground railway system. Of course, during that meeting plenty of time had been devoted to IUFRO affairs but quite exciting technical and cultural tours were also organized: Ivanteevka arboretum, National coordination centre for forest firefighting (Avialesookhrana), Sergiev Posad experimental forest and monastery, Moscow art museum and the internationally renowned Kremlin. This meeting was a perfect sample of what IUFRO colleagues like to propose when hosting a group: a highly balanced combination of science and art.

A few words on IUFRO

Dr. John L. Innes
Professor and Dean, Faculty of Forestry
University of British Columbia, Vancouver, Canada
IUFRO Vice President, 2006-2010

I have been associated with IUFRO for much of my career as a scientist. In fact, it was only at the start of my career that I really wasn't involved, yet this is perhaps the time that I would have benefitted from it most. The reason for not being involved was complex, but essentially was associated with the low opinion of the organization in the eyes of my then employers, the United Kingdom Forestry Commission. At the time, this organization was very inward looking and had remarkably little international involvement, a trait that is still evident today.

My first involvement with IUFRO occurred in 1990, when I attended the IUFRO World Congress in Montreal. While the Congress itself was interesting, it was during one of the week-long field trips that I really began to understand the benefits of sharing ideas with like-minded scientists from all over the world. And it was over breakfast one morning that I met my future employer: Rodolphe Schlaepfer of the WSL Research Institute in Switzerland. I can't remember what we had for breakfast, but I do clearly remember him leaning over the table and asking me whether I would be interested in a job at his Institute. He also asked if I would be interested in joining him on a Task Force looking at the effects of air pollution on forests, something that I gladly agreed to do.

It took some time, but in 1992, I left the UK Forestry Commission's Research Division and headed for Switzerland. For me, this was a huge step as I had never contemplated working outside the UK and had always thought that I might return to my native Scotland. The move to Switzerland effectively severed by links with the United Kingdom, but opened up new possibilities in Europe. Working with Rodolphe Schlaepfer on the IUFRO Task Force started to expand my horizons, and the stable position in a research institute meant that I could really concentrate on the science. This was rewarded in 1995 with a IUFRO Scientific Achievement Award, presented to me at the IUFRO World Congress in Tampere. 1995 also saw me take over the Task Force from Rodolphe Schlaepfer,

and expand its subject area to include climate change and other forms of environmental change. As in 1995, I participated in a post-Congress tour – this one went to northern Sweden and Norway and then crossed over into Russia. We saw the damage done to vegetation at places such as Nikel and Monchegorsk, and I often wonder what those sites must be like today. Did they recover, like the forests around Sudbury in Ontario, Canada, or have they remained industrial deserts? Maybe one day there will be an opportunity to return and see what happened.

Through IUFRO, I had met an American forest pathologist called John Skelly, who was based at Pennsylvania State University. He had done a lot of work on air pollution impacts on plants, and with his help, we set up an open-top chamber facility at Lattecaldo in the southern Swiss canton of Ticino. John became a good friend, visiting annually and providing me with a never-ending stream of advice about air pollution impacts and about the forest health surveys that I was responsible for in Switzerland. His passion for good science resonated with me, and I have tried to maintain his standards in my own work. Working with John and others from the IUFRO network, we put together a series of books on air pollution and climate change, publishing more than any other of the IUFRO Task Forces. This was largely a matter of timing: air pollution was still a hot issue in the 1990s, although by 2000 scientific interest was beginning to turn to climate change. The Task Force's book on the impact of carbon dioxide on forest ecosystems was one of the first of many to be published in this area.

In 1998, consistent with the mythical "seven-year-itch", I had begun to look around for new opportunities. One of my IUFRO contacts suggested that I consider a post at the University of British Columbia, in their Faculty of Forestry. Having had the chance, through IUFRO, to see forest practices in many parts of the world, I had decided that I would like to have more influence in educating the future foresters of the world, and an invitation from one of the biggest forestry schools in North America was too tempting. At the same time, I applied for a post at Oregon State University, but it was UBC that first made an offer. So, in 1999, I moved from one of the most liveable places in the world (Zurich) to another (Vancouver), a decision that I have never regretted.

By the time of the 2000 World Congress in Kuala Lumpur, Malaysia, I was firmly hooked on IUFRO. The Task Force continued for another term so that we could get some of the final products finished, but it was already beginning to be absorbed into the regular IUFRO network (as planned). In 2001, I received a surprise call that would cement my relationship with IUFRO. I was asked if I would chair the next Scientific Committee for the next IUFRO World Congress, to be held in Brisbane, Australia in 2005. I readily accepted, little knowing what it would involve and just how much of my time it would take up. Fortunately, I was able to strike up a very good relationship with the local organizing committee, ably chaired first by Russell Haines and then by Gary Bacon. It is a testament of the quality of this relationship that Gary and I have remained friends ever since. Being Chair enabled me to introduce a number of changes which I think have benefitted the Congress, including making sessions competitive rather than simply allocating them by IUFRO Division, developing online submission of papers, again competitively, controlling the content of sessions to avoid having too many speakers in a single session, and publishing the abstracts in a special issue of the *International Forestry Review*. We also stopped publishing the proceedings as a single set – the proceedings had become very bulky, expensive to produce and were read by very few people. Instead, individual sessions were given the freedom to publish the session proceedings if they so wished, and many took advantage of this more practical method of getting the knowledge into the literature.

One particular event comes to mind from this period. IUFRO has a small Management Committee that meets twice a year to discuss IUFRO business issues. Both Gary and I were appointed to this Committee as ex officio members, which provided us with the opportunity to

discuss Congress issues face-to-face on a regular basis. One such meeting was held in Moscow in 2003, and a visit to a couple of forest sites provided an opportunity to really learn about Russian hospitality.

The World Congress in 2005 was deemed to be a success, and that year I was appointed as one of the two Vice-Presidents of IUFRO, with Don Koo Lee being the President. The next five years provided many opportunities to understand IUFRO, and to provide some leadership in its administrative affairs, since my responsibility was policy. However, we also saw a blurring of the distinction between policy and research – particularly as IUFRO became more actively engaged in policy at this time.

In 2010, I was faced with a choice. I could either stand as the next President, competing with the very capable Niels Elers Koch from Copenhagen University, or I could stand as the next Dean of the Faculty of Forestry at the University of British Columbia. After discussing the dilemma with a number of colleagues within IUFRO, I chose the latter strategy. Niels went on to become President, and has served IUFRO extremely well in this role. My involvement continued, as I took on the role of Coordinator of the IUFRO Task Force on Resources for the Future. This worked well for me, as working on the future is exactly what a Dean should be doing, and so the roles have been complimentary.

So, what have I gained from my association with IUFRO? I believe that my entire career has been helped by IUFRO. I have met scientists who later became personal friends. I have had support and advice during difficult periods. I have developed an international perspective on forests that I would never have gained without IUFRO. I have had access to forests around the world that I would never have visited without IUFRO. This includes four separate visits to see forests in Russia – my only regret is that these visits have all been to western Russia, and the forests of Siberia and the Far East remain unknown to me. However, at the time of writing, I am once again a nominee for the IUFRO Board. Since, my IUFRO career looks like it will continue for a bit longer, there is still a chance to see these globally significant forests!

My IUFRO Experience

By Dr. Su-See Lee
Forest Research Institute Malaysia
Kepong, Selangor, Malaysia
IUFRO Vice-President (Task Forces), 2010-2014

IUFRO has really enriched my life. For me IUFRO's extensive linkages and global network has brought the world closer and made my research easier. The IUFRO structure has enabled me to find and contact researchers working in my fields of research and has allowed me to get to know researchers from all over the world, several of whom have become friends. IUFRO has broadened my horizons and outlook of the world, and given me the opportunity to visit many interesting places that I would not have visited otherwise. Through IUFRO I have also learned valuable lessons in human relations and how to work with people from many different cultures and backgrounds. I would not have gained these experiences if I had not become an active IUFRO office holder and attended some of the IUFRO World Congresses which are held every 4-5 years; the next is from 5-11 October 2014 at Salt Lake City, Utah, USA.

My first interaction with IUFRO was through participation in the IUFRO Workshop in Impact of Diseases and Insect Pests in Tropical Forests, held in Peechi, India in 1993, organized by the IUFRO Working Parties, S2.06-15: Diseases in Tropical Plantations and S2.07-07: Protection of Forests in the Tropics. Although these two IUFRO Working Parties no longer exist, having since

been reorganized, my memories of that workshop are still fresh and it was my participation in that workshop that first ignited my interest in IUFRO.

My involvement in IUFRO began with my election as Deputy Coordinator for two working parties in 1995. From there I moved on to become coordinator for a research group, and then General Board Member and member of the Management Committee, later becoming Chair of the Honours and Awards Committee. In 2010, I was elected to my present position as the first female Vice-President in the history of IUFRO, and from a developing country, Malaysia. In my view, this shows how much IUFRO has progressed over the years. The current IUFRO structure has a younger age profile, more officers from developing countries and more female office holders. I also see greater participation of young researchers in IUFRO meetings and World Congresses, and this is most encouraging. In recent years, I have also seen increasing recognition of IUFRO's role in many important international forums, processes and negotiations. This is a significant change from the IUFRO that I first knew.

As Vice President responsible for Task Forces, I would like to say something about the IUFRO Task Forces, which many may not know much about. IUFRO Task Forces are set up for a specific period of time and are aimed at strengthening IUFRO activities in specific areas and to contribute to the on-going international processes and activities. For example, the Task Force on Forests and Climate Change will no doubt be making some very pertinent contributions to the on-going dialogue at the Intergovernmental Panel on Climate Change (IPCC) while the Task Force on Forest Biodiversity and Ecosystem Services will be able to make significant contributions to the Convention on Biological Diversity (CBD) strategic plan and the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES).

Our other Task Forces are tackling some current "hot topics" such as Forest Bioenergy, Forest for People, and Forests and Water Interactions. The Resources for the Future Task Force aims to put IUFRO at the forefront of identifying new resources and trends in forestry and forest research. These Task Forces will also be producing technical publications, state-of-knowledge reports, conducting technical workshops and meetings. These activities and their outputs will provide important guidelines for forest science, thereby increasing the visibility of science-based research and IUFRO's ability to respond to new and emerging issues. I strongly believe that the Task Forces are well placed to further enhance IUFRO's role as the global network for science cooperation.

As a young researcher, my participation in my first IUFRO Workshop was sponsored by the IUFRO Special Programme for Developing Countries, now renamed the Special Programme for Developing Capacities (SPDC). Training courses conducted by SPDC have benefited many young (and sometimes not so young) scientists. Another IUFRO special project, the Global Forest Information Service (GFIS) has provided and continues to provide forest related information to an increasingly larger global audience. The reports and policy briefs provided by the IUFRO-led initiative "Global Forest Expert Panels" (GFEP) and IUFRO's Special Project on World Forests, Society and Environment (WFSE) have been well received and have succeeded in raising awareness among international policy and decision makers about some current issues. Overall, these programmes, projects and initiatives have enhanced IUFRO's profile as a provider of independent science-based information. The global research cooperation offered by IUFRO can strengthen capacity and research efforts of national and regional forest research organizations through information sharing, networking, training and active collaboration between partner institutions.

My institution and I have benefitted from our association with IUFRO and I am sure that you and your institution will too!

A Word about IUFRO

By Dr. John A. Parrotta
U.S. Forest Service, Washington, DC
IUFRO Vice-President for Task Forces, Special Programmes, Projects and IUFRO-led Initiatives, 2014-2019

I have been involved in IUFRO as an officeholder for nearly 20 years, starting in 1993 when my IUFRO "godfather", Les Whitmore (who was at that time the Coordinator of Division 1 – Silviculture) invited me to lead a new Working Party on tropical forest restoration. Since that time I have had the honor (and pleasure) of serving in a variety of IUFRO positions, including Deputy Coordinator and Coordinator of Division 1 (Silviculture), Deputy Coordinator of Division 8 (Forest Environment), Chair of the 2010 and 2014 World Congress Scientific Committees, Coordinator of IUFRO's Task Force on Traditional Forest Knowledge (2005-2010), Chair of the Collaborative Partnership on Forests' Global Forest Expert Panel on Biodiversity, Forest Management, and REDD+ (2012) and member of two other GFEP panels. I can say without hesitation that IUFRO provides unique opportunities for forest scientists of all backgrounds and positions to enrich their careers, and their lives.

When I first became involved in IUFRO, I had no idea just how valuable this association would become, and how many lasting friendships and collaborative relationships would develop with colleagues from all continents on a wide variety of topics, from restoration of tropical forests, to traditional forest knowledge, to environmental and social issues related to climate change mitigation and adaptation. My first IUFRO World Congress – in 1995 in Tampere, Finland – was an experience I will never forget. The energy, diversity, camaraderie, and of course the exposure to full spectrum of forest science worldwide experienced during this superbly organized Congress, had a major impact on me, both professionally and personally.

My work with colleagues from Russia on these topics has expanded my horizons, exposing me to the rich history, great potential and challenges facing Russia's diverse peoples in sustainably managing their unique forest ecosystems. IUFRO meetings, Congresses, Task Forces and Special Projects and Programmes enable all of us within the global forest science community to share our work and experiences, and expands our horizons (geographically, intellectually, and culturally) in ways that add tremendous value to our personal research and that of our home organizations.

IUFRO and me

By Professor Björn Hånell
Swedish University of Agricultural Sciences, Umeå, Sweden
Coordinator IUFRO Division 1 Silviculture, 2005-2014
IUFRO Vice President, 2014-2019

My very first contact with IUFRO was the XVI World Congress, in Oslo 1976. Nobel Peace Prize winner Norman Borlaug was keynote speaker and gave a most memorable presentation on high-yielding and disease-resistant wheat varieties that greatly improved food security in Mexico, Pakistan and India. What a performance! I was impressed with IUFRO in general, and with the size and quality of the Oslo Congress in particular. It was however not until much later, in spring 2000, I started to serve as an IUFRO Officeholder. I was invited to fill the position as Deputy Coordinator of Division 1 Silviculture. One (the only) Swede in Division 1 had stepped out and another was wanted to step in. This step was greatly facilitated by the Division Coordinator, Dr. John Parrotta.

He taught me a lot and the positive atmosphere he created in Working Parties and Research Groups made the serving as an IUFRO Officeholder great fun!

It seems that the older I get, the more important it is that what I do should be not only important and meaningful – but also fun. This is one of the two main reasons I enjoy working for IUFRO. The other is the fact that IUFRO has the capacity to go all the way from initiating the gathering of scientists to a meeting – to publishing their most recent results in peer reviewed scientific journals. As a scientist, that is exactly what I want. The continuously updated IUFRO Strategy guarantees that our work always has a global perspective and focuses on the most burning issues in forest and forest related sciences. With its position and influence in International Conventions, IUFRO makes a difference – and I would like to contribute to that difference!

Looking back on 25 years of service for IUFRO

By Professor Ladislav Paule
Technical University, Zvolen, Slovakia
IUFRO Division 2 Deputy Coordinator and Coordinator, 1996-2005

The very first IUFRO event I participated in was the IUFRO Norway spruce Symposium, held in Romania in 1979. I was a greenhorn in science, and also – in international events. In fact, in Eastern Europe there were not very many opportunities for a young scientist to participate in scientific conferences abroad. During the very first day, when testing my English I realized there are several version of English – spoken American English is different from the Irish one and is far away from the Eastern European version. The only participant from the Soviet Union was Professor Leonid Fedorovich Pravdin, whom I knew from the International Congress of Genetics held in 1978 in Moscow. His lecture was translated and read by Professor V. Giurgiu (who accomplished his Ph.D. in the USSR), but next day, due to Professor V.Giurgiu absence, I remained the only one who spoke Russian, and I was asked for an assistance to interpret the discussion between Professor Pravdin and the audience. It was not easy task; believe me: his Russian was perfect and my English was poor. During a weeklong excursion in the Carpathians, I played a role of personal interpreter, assistant and "bodyguard" of Leonid Fedorovich, and that was a pleasant story: never-ending talks always finished at Scots pine – a topic of his research and of my diploma thesis.

The meeting of the Working party was scheduled to be held on Poiana Brasov and, as usually, we were all the time in delay. Thus the meeting was held in field at the upper station of funicular on Mt.Postavarul in altitude of 1,300 m, where I was elected as the deputy coordinator of the Working party "Norway spruce genetics". It was the start of my 25 years long service for IUFRO.

After several IUFRO conferences held in early 1970s, I participated, the first big IUFRO event was a IUFRO Congress held in Ljubljana, in 1986. A nice event, many participants, and I also met a small group of Russians. During the final reception, I had the chance to talk to Nikolay A. Moiseev.

Later on, I have met with Professor Ivan Stepanovich Melekhov during my first and the last visit in Mytishchi in 1991. We have talked about IUFRO, and both of them complained that Russian was missing among the official languages. It was true, but I was far from responsibility to influence it. The only argument I could present to Ivan Stepanovich was that the Soviet Union should delegate more participants to IUFRO Congresses and to Working Parties, and it surely be changed. As an example, I used my case that I am also from Eastern Europe and serving for the second period as the WP officer.

To my surprise, at the IUFRO Congress in Kuala Lumpur there was a delegation of many Russians, who also positively influenced the cultural part of the final reception; but the lack of Russian among official languages has not been changed. Two election periods of my IUFRO activity as deputy leader and leader of the Norway spruce working party ended in 1990 and since that time, I was coordinator of the group, a Deputy Coordinator and Coordinator of Division 2. Genetics. Except the IUFRO conferences, there were annually meetings of IUFRO Executive Board, where I had the chance to meet the representatives of Russia – Anatoliy Pavlovich Petrov and Viktor K. Teplyakov, who were my partners and helped me to polish my Russian.

There was another topic tightly linked with my activities as Deputy Coordinator and Coordinator of the IUFRO Division 2. I have always felt there is a huge barrier between the western and eastern science, especially in the field of genetics. Sometimes, there were some historical reasons, another time a language barrier and limitations to publish in western journals. These reasons led in 1994 to the establishment of the international journal "Forest Genetics", which was considered to bridging western and eastern forest genetic science and practice. I felt this journal due to its modest price would be more accessible to institutes and laboratories within the former USSR and also to be a forum for publication of the research achievements in such international journal. Frankly speaking, after 12 years, these expectations are not fulfilled entirely, and I feel as failed trying to be a "bridge constructor". Nevertheless, during these years, I met many Russian geneticists at the scientific events in Russia, Latvia, Belarus and Ukraine or somewhere abroad with whom I always had nice discussions, which contributed to my better understanding of scientific problems of huge forest complexes in Russia and Siberia. I would like to mention few of these scientists – A.I.Iroshnikov, S.A.Mamaev, S.N.Sannikov, E.N.Muratova, L.I.Milyutin, D.V.Politov, V.V.Tarakanov or from the former USSR countries – G.G.Goncharenko, V.E.Padutov, I.N.Shvadchak, G.Postolache and others.

Time is running and we are getting older. My retirement age is approaching, and I can only remember well on the years spent as IUFRO officer, on the nice meetings with numerous colleagues and friends. When I started my scientific carrier, I had a dream to visit Siberia, which became a true just only twice. First time, I was at Lake Baikal as tourist and the second unforgettable trip to the Teletskoe Lake in Altai Region was during the Conference on forest genetic resources conservation in Siberia held in Barnaul in 2007. In modern period of my scientific carrier, I have added new topic to forest genetics – wildlife genetics, and I hope to realize again my dream from the early years of my scientific carrier, that is visit to Siberia.

IUFRO is the only…

By Yousry El-Kassaby
Professor, University of British Columbia, Vancouver, Canada
IUFRO Division 2 Coordinator, 2014-2019

IUFRO is the only international body that connects forestry researchers, I find it to be a crucial organization to belong too. The best thing is it is all based on volunteering and this is the true test of service. IUFRO allowed me to visit so many countries, including Russia, and meeting wonderful people all over the world. I take my role in IUFRO seriously and I hope to continue serving as long as I am capable of doing so.

In summary, life is a two-way street, so you are expected to give before asking and I cannot find a better organization than IUFRO to give to, and participate in, their great, noble cause.

IUFRO and me…

By Dr. Karel Vancura
Davle, Czech Republic
IUFRO Division 2 Deputy Coordinator, 2005

IUFRO and me, wow! Not easy task, if it should be short and quickly…

I graduated on Forestry Faculty of current Mendel University in Brno, Czech Republic in 1968 and after the studies worked as forester and head forester on forestry district of State Forestry Enterprise. Later, as an employee of Forestry and Game Management Research Institute (FGMRI), Dept. of Forest Tree Species Biology, I was responsible mainly for the improvement, species and provenance testing of coniferous tree species, *inter alia* trying to solve problems of forest areas affected by air pollution. The first contact with IUFRO activities was just through collaboration in IUFRO Air Pollution conference in 1974 (then also in 1984) and particularly in assessment of IPTNS/IUFRO provenance test with Norway spruce, preparation and founding of international provenance tests with Grand Fir and other North American tree species.

After political changes in 1990, I became vice-director for research of the FGMRI and later I headed the Institute for 6.5 years. Splitting of Czechoslovakia (1993) brought me into the IUFRO International Council on behalf of newly created Czech Republic, as before this position was held by my colleague Ladislav Paule from Zvolen Forestry Faculty, Slovakia. Prof. Paule said at that time: "Take it easy, you gained one more friend in abroad!"

We used to say: "one-eyed man is a king among the blind" – and as not too many people were able to communicate with foreign languages, I was responsible for more international activities of forestry. I was responsible for all four branches of IUFRO Centennial excursion in 1992, which crossed Czechoslovak territory, organized FAO study tour through air-polluted regions of so-called Black Triangle on Czech-German-Polish border, collaborated in preparation of the 1st Ministerial Conference on Protection of Forests in Europe (MCPFE) and worked as the national coordinator of this process up to 2006. In the meantime, I represented the country in COFO meetings in FAO, Timber Committee of the ECE, Standing Forestry Committee of the EU.

But the year 1995 was important for my IUFRO "career" and even position in this voluntary club and activity in further period. Jim Cayford, Vice-President of that time, invited me to represent West Europe region in the IUFRO Board. Having the promise of support for our Institute by the Minister responsible also for forestry I became a member of the EB after Tampere Congress and was a chair of *ad hoc* committee for changing of IUFRO status and internal relations. Funny was that this position thus hold a man who used so called 3E language (Eastern European English) having in the team American, Canadian, Englishman and IUFRO Secretary…Fortunately the Internet already existed and thus I had used the assistance of my colleague from Division 2, Dr. Howard Kriebel from Oregon, who repaired my wrong English formulations of my proposals. Of course, the result was so called Mid-Atlantic English and thus I had some problems with the President who was a Professor from Oxford ☺ In this function I participated in the Management Committee meetings several times.

I moved to the Forestry Development Dept. of the Ministry of Agriculture to be a member of negotiation team preparing the EU accession, and in this time, my activities were a bit far from biology and closer to forestry policy. During my 2nd term in the EB, I was responsible for *ad hoc* Honours and Awards Committee and I started to collaborate with the IUFRO RG 6.13.00 dealing with forestry and environmental legislation (changed into 9.06.00 after the Congress in Seoul, 2010).

My 3rd term in the Board started in 2006 in a position of Deputy Coordinator of Division 2 but was interrupted by serious health problem and I have to resign being transferred as partly disabled into pension... My IUFRO activities after 2007 (I decided not to travel too much) are mostly "from distance" – I am trying to offer some "voluntary papers" for concrete themes of RG 9.06 symposia as a contribution into meeting proceedings. I was surprised when I heard that I should receive the Distinguished Service Award on the proposal of IUFRO President. This "nice piece of wood", which I handled over to others before, I received in the meeting of the above-mentioned group in Zvolen, 2009. I was happy that I had received it from hands of Mr. IUFRO, former Secretary Heinrich Schmutzenhofer, who helped me a lot during my "*iufroculum vitae*".

Looking back, I can say it was a great time. Foresters can be proud for this scientific club of volunteers working worldwide. Unfortunately, still I feel lack of science-policy interface and it seems that those responsible are not able to use everything what IUFRO offers. On the other hand, foresters of all types must improve their bids and style of communication, which must be the base for overall coordination and collaboration.

I had an opportunity to know and see a lot and to meet nice, educated, clever, but quite normal and modest people. Hardly to enumerate anybody – not to forget others – nevertheless, I would like to mention at least Albrecht Behm, Eric Teissier du Cros, Howard Kriebel, Klaus von Gadow, Peter Herbst, Don Koo Lee, Csaba Matyas, prof. Morandini, Fred Pollet, Renate Prueller, Menachem Sachs and his wife Betsy, Jack Sutherland, of course my Czech colleagues Milos Knizek, Jiri Matejicek and Zdena Prochazkova…, and last but not least Heinz and Edith Schmutzenhofer. Thanks to all of you!

A Word about IUFRO

By Dennis P. Dykstra
Paso Robles, California, USA
Leader, Working Parties, Division 3, 1981-1995
IUFRO Division 3 Coordinator, 1996-2005

One of the most thrilling moments of my life was when I learned I had been elected Coordinator of IUFRO Division 3, "Forest Operations". That was in 1995, when I was Deputy Director-General of CIFOR, the Centre for International Forestry Research, in Bogor, Indonesia. I was privileged to serve as Division 3 coordinator for 10 years, from the time of the World Congress in Tampere, Finland until my second term ended at the 2005 World Congress in Brisbane, Australia.

My active involvement with IUFRO began in October 1978, when I attended my first IUFRO meeting, a symposium organized by Division 3 at Wageningen Agricultural University in the Netherlands. At that meeting I met several scientists with whom I later collaborated on research projects, and many others with whom I shared a lasting affection for IUFRO and its work. In 1981, I attended my first IUFRO World Congress, at Kyoto, Japan. At that Congress, I was elected as a leader of the IUFRO Working Party on "Accessibility in Mountain Forests", a unit of Division 3 dealing with research problems related to forest roads and other infrastructure in steep terrain. Over the following years I was able to attend many IUFRO meetings, including World Congresses in Montreal, Canada and Kuala Lumpur, Malaysia as well as those previously mentioned in Kyoto, Tampere, and Brisbane.

From my perspective, the great value of IUFRO is that it brings together scientists from a wide variety of disciplines and a great many countries, providing opportunities to learn about each other's research and to build relationships that last for many years. Because IUFRO involves many

different areas of expertise, it also helps scientists better understand research not directly related to their own work, and therefore can foster interdisciplinary efforts. I consider IUFRO to have contributed substantially to my career, often in ways that I could never have anticipated. I am certain that my research career would have been much less successful without the many contributions from colleagues associated with IUFRO.

A few words on IUFRO

By Klaus von Gadow
Professor Emeritus, University of Göttingen, Germany
IUFRO Division 4 Coordinator, 1996-2005

During our student years in Germany we had heard about IUFRO which we thought was a charming, antiquated club of foresters, drinking beer and telling stories about trees and deer hunting and therefore not really to be taken seriously. Many years later, in 1984, while working at the University of Stellenbosch in South Africa, I met Walter Liese and his wife who both encouraged me to attend the IUFRO Symposium on Forest Management Planning and Managerial Economics in Tokyo, Japan. There, I was amazed to meet a collection of distinguished and highly motivated scientists who shared my research interest, including Tasiti Suzuki, Yukichi Konohira, Oscar García, Dietmar Rose and Patrice Harou. That event profoundly changed my attitude towards IUFRO.

During this meeting, Othmar Griess asked me to initiate a new working unit within Division 4. We began communicating by means of a modest newsletter, which was compiled in Stellenbosch. Leading scientists, including many that I only knew from reading their papers, contributed to our newsletter. The spontaneous and enthusiastic exchange involving new lines of research, much of which had not yet been published, was an exciting experience and motivated me to support IUFRO more actively. During the following years, I continued to attend IUFRO events in Yugoslavia, South Africa, Austria, Russia, USA and East Germany, often accompanied by my wife Marga, and eventually was asked to join the IUFRO Board as Division 4 Coordinator with Margarida Tomé and Victor Teplyakov as deputies. It was a busy time with much travelling. Marga and I are grateful for the friendship and active support received from many IUFRO colleagues.

After serving two terms in an official capacity, I am happy to continue supporting IUFRO activities in a more informal way. The old prejudice of my student years has been replaced by the realization that IUFRO is a prime example of productive scientific networking. Research about natural forests and novel ecosystems (including industrial plantations and ecosystems completely modified by invasive tree species) has become more relevant than ever before. Our recently established Beijing-based international Open-Access journal "Forest Ecosystems" (http://www.forestecosyst.com/) provides a new platform for science reporting and discussion. Many members of our editorial board are former IUFRO colleagues. This shows the lasting effect of scientific networking within an established international structure.

Human activities determine the quality of forest habitats, the increase or reduction of water yields from forests, and the carbon balances and nitrogen processes in forests. Thus, we have come to realize that humans are not an external force, but an integral part of the ecosystems. Human designs and decisions, much more than the "forces of nature", determine which services and products may be provided sustainably. Obviously, forest assessment, modelling and design, the research topics of the units in Division four, will play an even more important part within IUFRO in the future. I encourage every young scientist to make use of the many opportunities that IUFRO is offering.

The book, career and IUFRO

By Professor Margarida Tomé
University of Lisbon, Lisbon, Portugal
IUFRO Division 4 Coordinator, 2006-2014

My first contact with IUFRO occurred in 1981. When browsing around a bookstore in Lisbon, I came across a book entitled "Growth models for tree and stand simulation". It was the well-known IUFRO Proceedings of meetings held in 1973 under S4.01.4 (edited by Jöran Fries). I was so impressed by this book that I immediately bought it and read it during next few days, making up my mind about what I wanted to do in the future: become a growth and yield modeler! But at that moment, my attention was not directed to IUFRO. At that time, I was starting a position as Teaching Assistant at Instituto Superior de Agronomia (School of Agriculture of the Technical University of Lisbon) and had never thought about following a research career, my main duties were teaching. Some months later, I got the announcement of a IUFRO Conference in Vienna, Austria, and I realized that it was organized again by IUFRO S4.01 and I became aware of the relevance of IUFRO for those who wanted to be in the world of forest modelers! I tried hard getting funding to participate in this meeting but was unable to get it.

September 1983, in the sequence of the Workshop on "Future Expectations for Portuguese Forestry" organized jointly by the Portuguese Science Foundation and the National Academy of Sciences (USA), I had the opportunity to apply for a scholarship to improve my research skills in Forest Modelling at Virginia Polytechnic Institute, USA, where I met this extraordinary person that is Harold Burkhart. He brought me to the forest modelling world and, later on, he also introduced me to IUFRO by suggesting my participation in the IUFRO Conference "Forest Growth Modelling and Prediction" held in in Minneapolis, Minnesota, USA, 1987. I tried hard to find some funding and I even wrote to Dr. Oscar Fugalli, special coordinator for developing countries asking for support but I got the answer: "Unfortunately (or fortunately?) Portugal cannot be regarded as a developing country…" (a fair answer in fact). I finally was able to get the funding from the Portuguese Science Foundation and this was really my introduction to the IUFRO world.

In this meeting, I had the opportunity to meet a set of colleagues, such as J.P.Skovsgaard and Asa Tham, to whom I have been connected since then. At that time, we had no e-mail or other internet connections, therefore IUFRO has been crucial to maintain the contact with colleagues from all over the world, opening my views and opportunities to participate in the most important forest modelling *fora*. Just to mention some examples of the meetings in which I participated while preparing my Ph.D. thesis, I remember Vienna (1987), Berkeley (1988), Syracuse (1989) and, of course, the 19th IUFRO World Congress in Montreal, my 1st IUFRO World Congress. In Montreal I started my formal contribution to IUFRO becoming co-chairman of the S4.01-04 (Growth models for tree and stand simulation).

Those were my first contacts with IUFRO, very important for my career and to my personal life. In 1997, jointly with my colleagues Ana Amaro and Luís Santos, I organized in Oeiras, Portugal, the IUFRO Workshop "Empirical and process-based models for forest tree and stand growth simulation". It has been a great adventure, a lot of work but also a lot of fun!

During the Conference "Modelling regeneration success and early growth of forest stands" held in Copenhagen, Denmark, 1996, I met another "IUFRO forester" that was very influential to me: Klaus von Gadow. Later, he proposed me to become Division IV deputy leader at the time he was the Division leader. We had great times, trying to maintain Division IV at a high standard. And I succeeded him on the lead of the Division, task in which I have been for the last 8 years. This is, in summary, my story with IUFRO!

Thank you IUFRO!

IUFRO, Math and Russia

By George Gertner, Professor of Biometrics (Emeritus)
University of Illinois, Urbana-Champaign, USA
Leader, IUFRO Subject Group S4.11, 1986-1995
Coordinator, IUFRO S4.03.01, 1996-2014

I was introduced to IUFRO as a Ph.D. student at the University of Washington in Seattle by my Ph.D. mentor, Professor Kenneth Turnbull. He was involved in the organization and always emphasized to his graduate students the importance of international research collaboration. After graduating with my doctorate, I became an assistant professor at the University of Illinois where my department and university were very supportive of the active involvement of their faculty in international organizations. For this reason, I became actively involved in IUFRO and attend many different international conferences where I presented numerous papers, and met many new colleagues and future collaborators. Still as a young assistant professor, I was elected in 1985 as the Leader of Subject Group S6.02 (later moved to Division 4, as S4.11), Statistical Methods, Mathematics and Computers; and was elected for a second five year appointment ending in 1995. As the leader of this subject group, I was involved in the organization of more than 20 international conferences over the 10 years. From 1996 to 2014, I have been the Coordinator of S4.03.01, Uncertainty Analyses of Spatial and Non-spatial Models.

I have been in Russia three times: twice to Moscow region to organize an IUFRO, Subject Group 4.11 conference on, Statistical Methods, Mathematics and Computers; and once on a train trip from Zurich to Vladivostok, to attend the 2010 IUFRO World Congress in Seoul, South Korea. During my train trip across Russia, I witnessed many very large forest fires that broke out across western Russia. These wildfires were due to extremely dry and hot weather conditions across most of Russia that were attributed to possible climate change and a number of natural and anthropogenic factors. The losses due to these fires were huge for Russia and the world.

Beyond the wildfires, I was overwhelmed during my visits to Russia by the magnitude of its forest base, its diversity and its beauty (when not burning). Given the size of the forest base, and the many complex issues related to environmental protection and forest sustainability, it is quite obvious that the Russian forests have genuine significance to the Russian and international community.

Historically Russians have used mathematics and statistics to help address some of these issues. For example, in the 19th century, Vasily Tarasovich Sobichevski (1838-1902)[313], a trained mathematician who became a research forester, proposed the establishment of long-term experimental research studies in Russia. Even in the 19th century applied mathematical and statistical methods (and simple computers: abacuses) were needed to analyze the findings of such long-term studies based on scientific principles. During my visits, I have met numerous renowned Russian statisticians, mathematicians, modellers and computer scientists who are addressing today's current issues using more sophisticated methods (and computers) than what V.T. Sobichevski used. One role for research organizations like IUFRO is to bring these Russian researchers and scientists together with their international counterparts, to solve these very complex and important issues that are facing Russia and the world.

[313] See, for example, Teplyakov, Victor K. *et al*. (1998) A History of Russian Forestry and Its Leaders. Pullman, Washington State University, 96 pp.

Impressions of IUFRO

By Howard N. Rosen
U.S. Forest Service Retired, Washington, D.C., USA
Deputy Division 5 Coordinator, 2000-2005
Chair 5.10.01 Wood Culture Working Party, 2008- 2014

My first IUFRO Meeting was in 1980 in Oxford, England, and I started my activity by presenting a paper in the wood drying research session. I was fascinated by the technical contacts I could make around the world to improve my personal research. The activities through the years in IUFRO helped me to advance a large effort in international forest products research and that has lasted until today. I have been to every IUFRO World Congress and Division 5 Meetings since 1986, which has allowed me to see wood products and forestry research programs all over the world.

My first World Congress was in Ljubljana, Slovenia (then Yugoslavia) which gave me a wide view of forestry research administration throughout many parts of the world. The World Congresses are attended by leaders of many institutions and universities and, in my view, tend to be more scientifically political than the division or working party meetings. Thus, the Division and Congress meetings provide a good mix of strong science and good opportunities to network with the top people in the field of forestry.

One of my most memorable foreign visits was to Moscow State Forestry University in Mytishchi in the Moscow Region of Russia in the summer of 1996 for the International Conference on Properties of Wood. I stayed at the home of Professor Gregory Shubin and met with Professor Boris Ugolev, Professor Valentin Shalaev, Rector Alexander Oblivin and many others at the University. Later, we met many times at other different meetings and locations, but I was especially excited about this trip, since my grandfather emigrated from Belorussia in 1906, and this was the first trip to Russia for anyone in our family since 1906.

Today I am retired and do mainly volunteer work, but I am still active in forest products research and maintain activities in IUFRO, the International Academy of Wood Science, the International Wood Culture Society, the US Society of Wood Science and Technology, and the US Forest Products Society.

IUFRO participation

By Dr. H. Fred Kaiser
Retired Director of Economic and Social Research
U.S. Forest Service, Washington, D.C., USA
IUFRO Division 6 Coordinator, 1987-1995

As head of Division 6 for two terms, IUFRO provided opportunities for me to interact with international forest scientists and aid in international cooperation in forest-related economic and social research. Through my IUFRO activities, IUFRO broadened my understanding of the importance of economic and social research and as Director of Economic and Social Research for the U.S. Forest Service, IUFRO provided ideas for our research program.

Russian IUFRO members were key participants in my two terms as head of Division 6. First was suggesting and helping organizing the development of IUFRO sponsored conferences on Taiga or Boreal Forests. The taiga is the world's largest forest biome and in North America, it covers most of inland Canada and Alaska as well as parts of the extreme northern continental United States. In Eurasia, it covers most of Sweden, Finland, much of Norway, some

lowland/coastal areas of Iceland, much of Russia from Karelia in the west to the Pacific Ocean including much of Siberia and areas of northern Kazakhstan, northern Mongolia, and northern Japan. At the IUFRO sponsored conferences, such topics were discussed as the identification and measuring the taiga forests and different approaches used including quantification of carbon storage. Research findings were also presented on identification and the influence of forest pests, insects and fire.

Russian IUFRO members were key organizers and participants in my two terms as head of Division 6 in the advancement of the understanding of economic and social values of forests. Two meetings were held in Russia, which proved to be an excellent form for understanding of the importance of economic and social aspects of forests. The first meeting focused on methods of non-market valuation and the role of economic values in sustainable forest management. The second meeting addressed the use of values in public land forest management. At the second meeting both forest scientists and forest policy officials provided how in their countries forest values are determined and how they contributed and influenced public land forest management.

IUFRO and its Division 9

By Dr. Daniella Kleinshmidt,
Assoc. Professor, SLU – Swedish University of Agricultural Sciences
Uppsala, Sweden
Coordinator of IUFRO Division 9, 2010-2019

My relationship with IUFRO is nearly as long as my professional career is. It started during my Ph.D. studies at the University of Göttingen at the end of the 1990s. My major link to IUFRO has been my supervisor Professor Max Krott who was actively involved in IUFRO for many years and successfully convinced me that IUFRO is not only an important network but as well fun. It took me some time to understand the structure of IUFRO but once understood I liked a lot to be part of it. My first activity was to support organizing a specific part of the poster session for the IUFRO World Congress in Malaysia 2000. This was of course as well a very good reason to participate in this event. It was overwhelming to meet so many scientists with similar interest in the same subject. After that, I became even more active, first, as Deputy Coordinator and in the next term as Coordinator of the Task Force “Communicating Forest Sciences”. I enjoyed the work in the Task Forces a lot, as it gave the chance to link science with professional communicators and political decision makers. The meetings of the Task Force have been inspiring and one of the outputs, a manual for Public Relations of Forest Science has been proven useful in many trainings organized by IUFRO SPDC.

After splitting Division 6, the IUFRO Division on social science into two Divisions (6 and 9) during the IUFRO World Congress in Seoul in 2010, I became a Coordinator of the newly established Division 9. I am grateful for the trust of the IUFRO leadership and the officeholders in Division 9 to give this position to me. Working in this position means to strengthen even more the collaboration with those working within the Division but as well with those concerned with the other Divisions. Thus, I appreciate it as a strong and lively disciplinary network and an opportunity for interdisciplinary work at the same time. One of my major aims in this position is to strengthen the social science perspective in IUFRO. I am convinced that forest sciences including the social science perspective can contribute to more holistic solutions of problems concerning forests around the globe.

Division 9, Forest Policy and Economics, is an excellent example of the diverse perspectives social science can take, e.g. political, economic and historical sciences, cultural and regulatory aspects and the many interfaces between these areas. Our first Division 9 conference that took place in Sarajevo, Bosnia & Herzegovina, in 2012 was a great success. It succeeded in presenting the different facets of social science dealing with forests. I learned a lot during this conference and this learning aspect is one I appreciate a lot in IUFRO. I am still surprised that this is all possible on a voluntary base, but I assume that this is exactly the reason why it works. Enthusiasm for the issue is key in this network.

I have had the chance as well to learn more about managing an international voluntary organization, being part of the IUFRO Board and of the Management Committee. I am very grateful to my IUFRO colleagues that they shared their experiences with me.

For those who don't know IUFRO, I am suggesting to get involved, take the chance to meet people from all over the world, make new friends, strengthen your network and get surprised what you can learn!

Some impressions about IUFRO, Russia and Congress

By Dr. Gary Bacon AM
Adjunct Professor, Griffith University
Nathan, Old, Australia
Chair, XXII IUFRO World Congress Organizing Committee, 2005

It was my good fortune to visit USSR/Russia on two occasions, one representing Australian State Forestry in 1990 and later with IUFRO in 2003. On both occasions, I met practitioners and professionals in a most convivial, interactive, and hospitable environment. Those rewarding memories will never be diluted let alone effaced.

The first visit provided opportunities to view and discuss forest establishment, silviculture, pathology and reclamation at various All Union/USSR Institutes sited at Moscow, Pushkino, Tashkent, Sukok and a highlight social visit to the Tolstoy Estate at Tula. At that time, Academician Dr. Nikolai Moiseev was Director of VNIILM at Pushkino. Other senior staff of the Institutes included A. Raspopov, V. Tuzov, Kaimov, and Serebryakov.

The second visit was for the FIRST meeting in Russia of the IUFRO Management Committee. I attended as Chair of the 2005 Congress Organising Committee and met again the energetic Russian representative on the Board, Dr. Victor Teplyakov. The visiting group led by Professor Risto Seppälä, President of IUFRO, and including past President, Professor Jeff Burley, and future President, Professor Don Koo Lee, also had an opportunity to meet the head of the Russian Forest Service, Dr. Valeri Roshchupkin.

Of course, I had the real pleasure of welcoming a number of Russian delegates, including Professor Valentin Shalaev, to my home turf and forests in Brisbane in August 2005 for the XXII World Congress.

After waiting 113 years to host the IUFRO World Congress the Aussie organising team and their many volunteer supporters pulled out all stops to entice, enrol and ensure participants enjoyed the 22nd Congress, the FIRST ever in the Southern Hemisphere. Over 2100 participants from 90 countries shared their passion for forestry research, innovation and application in the friendly tropical city of Brisbane. And there were many opportunities to supplement professional discourse with cultural entertainment and local sightseeing. The weather was "Queensland perfect" for outdoor events such as the tree planting where young indigenous performers inspired the attendees with their vigour and messages on what trees mean to them. The sun shone for the in-congress tour day when

1400 delegates boarded buses and ferries and were whisked off to over 75 different inspection sites within the southeast region. The Scientist Assistance Program made it possible for over 80 younger scientists from developing countries to be invited to attend Congress. The majority were women and many were able to participate in the pre-congress training courses. [I made a paragraph here]

An innovative 'Making the Most of Congress' session gave 200 new attendees a taste for what to expect and pointers on optimising their involvement. Five keynote speakers provided inspirational platforms for later panel discussions. While all presenters came from different disciplines the Congress theme of "Forests in the Balance: Linking Tradition and Technology" provided an apt, linking focus, whilst the recurrent use of the newly resurrected dinosaur tree (*Wollemia nobilis*) offered a real life example. The range of technical session coverage augmented by quality posters was simply awesome. A rich and diverse program matrix gave the majority of delegates almost too much to choose from. Add in the spectacular showcases within the concurrent Exhibition, memorable national entertainers from Australia and Korea, special lunchtime presentations from IUFRO awardees, a novel President's Discussion and Research Directors Forum, and a plethora of Divisional and satellite events and free time was at a premium. The gala exit function typified the Aussie informal approach that sought to ensure delegates had multi-themed spaces and entertainments for personal farewells. Many visitors took the opportunity to recover from the hectic pace of the Congress week to explore more of the Australian landscapes and that of its near neighbours in scheduled and private post –congress tours.

I will never forget the time spent in the company of 'true-blue' (a term we use in Australia meaning staunchly loyal) forestry professionals within the canopy of IUFRO. The opportunity to travel widely and meet so many dedicated Forestry professionals from every nation was a true god-send. The global organisations of IUFRO and FAO Forestry were populated with men and women of outstanding ability, with undoubted passion and commitment for all that is good that the Forestry enterprise brings to the human condition.

My association with IUFRO

By Brian Payne,
Fairfax, Virginia, USA
Assistant to the President IUFRO, 1982-1986
IUFRO SPDC Coordinator, 1993-1996

It has been a long time since I have been associated with IUFRO. For me, it began in 1982 when I became Bob Buckman's half-time assistant in his role as IUFRO Vice President. I helped him and the Program Committee for the 1986 World Congress in Ljubljana. With financial support from the World Bank and UNDP we worked to set up IUFRO's Special Programme for Developing Countries, hiring Oscar Fugalli, just retired from FAO, as its first coordinator.

In 1990, I helped Jerry Sesco (who had replaced Robert Buckman as head of the USDA Forest Service Research) organize U.S. participation in the IUFRO World Congress in Montreal. In this connection, I became acquainted with Lorne Riley, who was general chair of the Montreal Congress and who succeeded Oscar Fugalli as SPDC coordinator in Vienna.

In 1993, I succeeded Lorne Riley and served as SPDC coordinator for three years until 1996, when Bob Szaro took over. As SPDC coordinator, I was in charge of the financial support program that brought representatives from many developing countries to the World Congress in Tampere, Finland in 1995. There, FAO was represented by David Harcharik, who had been my supervisor for many years in Washington, D.C. during my work for the USDA Forest Service. Because I attended three World Congresses and many IUFRO Executive Board meetings for four years with

Bob Buckman and three more with SPDC, I knew Presidents Walter Liese, Dusan Mlinsek, Robert Buckman, Salleh Mohd. Nor, Jeff Burley, as well as Risto Seppälä, and Niels Elers Koch before them each became president.

Of course, there were dozens more fine men and women active in forestry research around the world whom I was honoured to know, among them your countryman Professor Nikolai Moiseev. I left IUFRO in 1996, and I retired from the U.S. Forest Service in early 2000. The years have gone by, but the memories are still fresh, and almost all of them are good ones.

IUFRO reflections

By Dr. Robert C. Szaro
Reston, Virginia, USA
IUFRO-SPDC Coordinator, 1996-2000

If you go to the IUFRO website, it states that "IUFRO is the global network for forest science cooperation." But what does that really mean from a personal perspective? To me IUFRO is best described as a "global friendship network." I was first exposed to IUFRO at the Montreal Congress in 1990. Little did I know that it was the start of many things to come and the development of a long relationship with IUFRO. There were so many interesting presentations that it was tough to decide between them. Sometimes it was tough to get to one because there were so many fascinating people to talk to before you even got there.

When people gather to talk about their passion for forests along the way they also become good friends. IUFRO is all about sharing, learning, and helping each other to gain a better understanding of forests and their uses. At each Congress I learned something new and was amazed at what my colleagues had discovered.

I was honoured to serve as Coordinator for the Special Programme for Developing Countries (IUFRO-SPDC) for 4 years from 1996 to 2000. The work of the SPDC consistently sought to assist in the development of human resource capacity in developing countries and emerging economies. It seemed like I was always travelling to either organize workers or to meet with potential donors. As a result of our success with donors, the SPDC organized workshops on research management and planning, grant writing and proposal development, and strategic planning. Over the 4 year period SPDC supported more than 200 scientists and 35 meeting organizers in more than 60 countries. This included providing support for scientists to attend our training workshops at the 2000 Congress in Kuala Lumpur, Malaysia.

The Japanese Government was a generous supporter of the BIOREFOR Programme, which stimulated collaboration among many institutions in the Asia-Pacific to contribute to our knowledge on how biotechnology can be used for reforestation efforts. The European Commission provided resources for the GFIS-Africa project, a cooperative effort between IUFRO and FAO, was designed to foster forest related information sharing in Africa. This early work has now been incorporated into the Global Forest Information Service. The United States and NATO-Scientific enabled the Carpathian Mountain project on the effects of air pollution on forests from the Czech Republic to Romania.

Through all of this, it is the relationships with people and the learning about new places that are the most memorable to me. Wherever IUFRO hosted a meeting, there was a chance to learn and be exposed to unique opportunities. These opportunities ranged from riding on an elephant to see White Rhinos in Nepal to climbing Mt. Iremel in the southern Ural Mountains of Russia.

IUFRO will always have a special place in my heart and mind.

Chapter 33
IUFRO Developments in Russia

IUFRO member organizations in Russia

It was not only the vast areas of its forests which have made Russia attractive for the global community, but also its successful developments in silviculture, achievements in forest sciences, forest education as well as its immense contribution into the development of the holistic approach to drought management and other achievements. Therefore, Russia was invited to join the International Union of Forest Experiment Stations in the early years of its existence.

In 1896, the Assembly of the Union was held in Braunschweig (Germany), and its participants gave rousing cheers when the Chair of the meeting announced that Mr. V.A. Tikhonov, State Councillor, Vice-Director of the Forest Department of Russia, and Mr. C.G. Holmerz, Director of the Stockholm Forestry Institute in Sweden, had officially informed the Union about the decisions of their countries to join the organization (IUFRO 1896, p.73). According to I.S. Melekhov, Russia already started its active collaboration with IUFRO in 1897 (Мелехов 1993, p.102), and in 1900, young G.F. Morozov participated in its III Congress (IUFRO 1900, p. 11).

By the early twentieth century, the well-developed areas of forest research included forest mensuration, inventory and management planning, silviculture and forestry and shelterbelt establishment. They were based on numerous experiments and robust theories – it was accounted for by the demands from the forestry practitioners. In the 19th and early 20th centuries, forest research was undertaken by forest higher education institutions, selected universities, experimental and training forest management units and forest experiment stations.

After 1917, a new epoch of forest research development emerged in Russia (the USSR): university-based research was complemented with sector-specific applied research institutes in forestry, timber industries, wood-working, resin industry as well as forest laboratories and institutes under the Academy of Sciences.

In line with the proposals, made by M.M. Orlov (Орлов 1906, 1915), a Central Forest Experiment Station was established in Moscow in 1926. The Station included the following core units: silviculture and forest science, forest regeneration, forest protection, forest drainage, forest enumeration, commercial hunting and game management, forest engineering, timber production, forest management and conservation promotion. Actually, it was the first forestry research institute.

In 1926, a branch of the Central Forest Experiment Station was established in Leningrad, and in autumn 1929, the functions of both the Central Forest Experiment Station and its Leningrad Branch were transferred to the National Forestry Research Institute which was later renamed into the Leningrad (now, St. Petersburg) Forestry Research Institute (SPbNIILKh). For a long time, this Institute was the top forestry research institute in such areas as forest fire management, forest drainage, silvicultural treatments, forest plantation cultivation, protected areas, use of chemicals in forestry, and labour management. It is the main forest institute for the North-Western Region of European Russia. Several Forest Experiment Stations and experimental forest districts (*leskhozes*) were subordinated to it. The Institute has been a Member Organization of IUFRO since 1993.

The USSR Research Institute of Silviculture and Forestry Mechanization was established in 1934 (in 1992 it was renamed into the Russian Research Institute of Silviculture and Forestry Mechanization/VNIILM). It became the main forestry think-tank, designated to produce R&D

projections, plans and guidelines on reforestation, forestry economics, forest inventory, management and planning, integrated forest pest management and protection against technogenic impact, mechanization and automation, standards and metrology, labour safety and sector-specific sociology. The Institute is the lead research organization, focusing on forests, growing the central part of European Russia and in the Urals. It managed several forest experiment stations, research stationary facilities and an experiment forest management unit (*Leskhoz*). The Institute joined IUFRO in 1976.

The Far East Forestry Research Institute was established in 1939. It became the leading research institution in the area of Siberian/Korean pine forest management and silviculture in the Amur River watershed and Russian Pacific region; and the main research centre for forests of the Russian Far East. It managed several forest experiment stations and an experiment forest management unit.

The Arkhangelsk Forest and Forest Chemistry Research Institute was established in 1958 (in 1997 it was renamed into the Northern Research Institute of Forestry). The Institute is the main research centre in the area of resin tapping, silviculture in tundra-adjacent forests, utilization of wood waste; and it is the central research organization for taiga forests in the northern part of European Russia. It included the Northern Forest Experiment Station, a research facility and an arboretum.

Established in 1968 in Krasnoyarsk, the USSR (Russian) Research Institute of Forest Fire Management and Forestry Mechanization is the main R&D centre, designing machinery and equipment for forest fire fighting and studying Siberian forests.

In 1970, the USSR Research and Operation Association for Tree Breeding was established in Voronezh, and in 1992, it was re-organized into the Research Institute of Forest Genetics and Breeding which became the main research centre in the area of forest breeding, genetics, seed breeding, species introduction and nursery management and also the central forest research organization for Southern Russia. It joined IUFRO in 1990.

In 1973, the USSR Research Institute of Chemicals for Forestry which is the main national research centre in the area of use of chemicals and radiation ecology in forestry.

In 1987, respective units of the Central Forest Seed Breeding and Testing Station and some other enterprises were merged into the *HAZELNUT (FUNDUK)* Research and Operation Association for Nut Species Breeding which became the main research centre for forest nut species breeding, and technology development for mass-scale production of bred forms and varieties, including establishment of stool beds.

In 1988, the research units of the USSR "Lesproyekt" Operation Association, the "Soyuzhyproleskhoz" Research and Planning Institute, and the Central Bureau of R&D Information were re-organized to establish the National Research and Information Centre for Forest Resources (VNIITslesresurs). The Centre became the main research institution in forest account, silvicultural and environmental assessments and projections related to forest resources, global climate change, management of national forests, mapping and remote sensing methods for forest assessment and research, forest monitoring and inspection, and ICT development in forest research for the benefit of the forest sector. The Centre joined IUFRO in 1990. Now, this name belongs to another organization, providing similar services.

In 1992, the Mountainous Forestry and Forest Ecology Research Institute was established on the basis of the Sochi Forest Research and Experiment Station for Subtropical Forest and Forest Park Management, founded in 1944 and reorganized into the VNIILM's Caucasus Branch. The Institute is the main research centre for mountain forestry, recreational forest uses and forest management in protective zones around health resorts, exotic species introduction, urban landscaping; and the central research organization, specializing in forests of the Northern Caucasus.

The USSR/Russian Institute of Continuous Education in Forestry was established in 1975. It remained a purely training facility, but in the recent 25 years, it has been implementing significant international cooperation activities in addition to its professional development and retraining services for Russian forest managers. The Institute joined IUFRO in 1990.

As of the end of the twentieth century, there were 10 forestry research institutes and 18 forest experiment stations throughout the country – from Kamchatka in the east to Kaliningrad in the west and from Archangelsk in the north and the Caucasus in the south. In addition to forest experiment stations, research institutes had special stationary research facilities, laboratories, nurseries, field research sites, experiment designing bureaus, experimental plants, experiment forest management units (*leskhoz*, *lesnichestvo*). They, all together, employed over 2,000 R&D personnel. Each research institute performed two functions: to specialize in targeted forestry areas and to cover a geographic area (zone) of the country. The specialization of each Institute depended on its main research areas where the Institute was the lead methodological and coordinating organization. The geographically specific functions embraced the whole range of forest management operations within the covered zone. Geographically specific functions were the same for all the Research Institutes, but the technology of their performance varied by their location (Тепляков и Бергер 1994).

In spite of its robust capacity, the research and experiment system of the forestry sector remained insufficient for the country's forest estate. In particular, forest research institutions were distributed very unevenly: the north-western part of European Russia had two institutes, five institutes were located in the central region, and the south, Siberia and the Russian Far East had one research institute each. In the first half of the twentieth century, forest research underwent significant changes and many research institutes were reorganized, converted or closed. Currently, the Federal Forestry Agency subordinates the following five research institutes:

- *The Russian Research Institute of Silviculture and Forestry Mechanization* (VNIILM), including the Eastern European Forest Experiment Station (in Kazan), Central European Forest Experiment Station (in Kostroma), Siberian Forest Experiment Station (in Tyumen), and Southern European Forest Research and Experiment Station (in the village of Vyoshenskaya, Rostov Oblast);
- *The St. Petersburg Forestry Research Institute*, including its experiment sites in the Leningrad and Pskov Oblasts, Republic of Karelia as well as the Siberian Office of this Institute which was opened in 2011 in Krasnoyarsk;
- *The Far East Forestry Research Institute*, including one of the oldest arboreta in the Far East (established in 1896), but its forest experiment stations were closed in 2005 (Рослесхоз 2012);
- *The Northern Research Institute of Forestry*, including the Northern Forest Experiment Station, regional laboratory (in Vologda) and Russia's northernmost arboretum, established by I.S. Melekhov in 1960; and
- *The Russian Research Institute of Forest Genetics, Breeding and Biotechnology* (formerly, the Research Institute of Forest Genetics & Breeding) with its field research site "Shipov Les".

Talking about those reorganizations, it is worthwhile to refer to Directive of the Government of the Russian Federation № 921-p of July 1, 2005, issued to close 11 federal forest institutions, including the National Research and Information Centre for Forest Resources /VNIITslesresurs (in Moscow), 4 forest experiment stations (Baikal FES in Ulan-Ude, Kamchatka FES in Petropavlovsk-Kamchatsky, Sakhalin FES in Dolinsk, Sakhalin Oblast, and Primorskaya FES in Vladivostok) and 2 field research sites (in Luga, Leningrad Oblast, and in Svobodny, Amur Oblast).

Apart from the forestry sector research institutes, forest-related studies were also undertaken by many forest higher schools, research institutions of the Russian Academy of Sciences (RAS), Russian Academy of Agricultural Sciences, Russian Academy of Natural Sciences as well as

research units of various ministries, including the Russian Ministry of Natural Resources, Ministry of Emergencies, Ministry of Agriculture and other agencies.

Year (number)	Name, address
1947 (143)	*V.N. Sukachev Institute of Forest*, Siberian Branch, RAS; Akademgoridok, 660036, Krasnoyarsk-36, Russia;
1976 (392)	*Russian Research Institute of Silviculture and Forestry Mechanization* (VNIILM); Institutskaya Str. 15, 141200 Pushkino, Moscow Oblast, Russia; http://www.vniilm.ru/
1990 (647)	*Moscow State Forest University*; 1st Institutskaya Str. 1, 141005, Mytischi, Moscow Oblast, Russia; www.msfu.ru
1990 (656)	*Russian Institute of Continuous Education in Forestry*; 141200, Institutskaya Str. 17, 141200 Pushkino, Moscow Oblast, Russia; http://www.vipklh.ru/
1990 (657)	Russian Research and Information Centre for Forest Resources; Novocheryomushkinskaya Str. 69a, 117418, Moscow, Russia.
1990 (658)	*Russian Research Institute of Forest Genetics*, Breeding and Biotechnology; Lomonosov Str. 105, 394043, Voronezh, Russia; http://www.vniilgisbiotech.ru/
1993 (718)	*St. Petersburg State Forest Technical University named after S.M. Kirov*; Institutskiy Pereulok 5, 194018, St. Petersburg, K-18, Russia; http://ftacademy.ru/
1993 (719)	*St. Petersburg Forestry Research Institute*; Institutskiy Pereulok 21, 194021, St. Petersburg, Russia; http://www.spb-niilh.ru/
1998 (819)	*Volga State University of Technology*; Lenin Square 1, 424001 Yoshkar-Ola, Republic of Mari-El, Russia; http://www.volgatech.net/
2000 (849)	*IUCN Office for Russia and CIS*; Marshal Vasilevskiy Str. 17, 123182 Moscow, Russia
2002 (871)	*Siberian State University of Technology*; Prospekt Mira 82, 660049 Krasnoyarsk, Russia; http://www.sibstu.kts.ru/
2003 (889)	*Urals State Forestry Engineering University*; Sibirskiy Trakt 37, 620100, Yekaterinburg, Russia; http://www.usfeu.ru/
2005 (899)	*Zdorovyi Les* Non-Commercial Partnership Strategic Alliance (NPSA); Stroitelnyi Proyezd 7A, building 3, 125362 Moscow, Russia; http://npzles.ru/
2006 (926)	*Institute of Biology and Soil Science*, Far East Branch, RAS; Prospekt Stoletiya Vladivostoka 159, 690022, г. Vladivostok, Russia; http://www.biosoil.ru/
2008 (941)	*Faculty of Forest Engineering*, Petrozavodsk State University; Lenin Avenue 33, 185910 Petrozavodsk, Republic of Karelia, Russia; http://petrsu.ru/Faculties/lif.html

In the twentieth century, Russia developed robust research capacity of higher education, following up the traditions of the Imperial Forest Institute in St. Petersburg and the Peter Academy of Agriculture and Silviculture in Moscow. Many of Russian higher schools, involved in addressing forest issues (the Moscow State Forest University in Mytischi, Moscow Oblast; St. Petersburg State Forest Technical University named after S.M. Kirov; Volga University of Technology in Yoshkar-Ola; Siberian University of Technology in Krasnoyarsk, Ural Institute of Forest Engineering in Yekaterinburg, Petrozavodsk State University), joined IUFRO at different times (see Table). Many projects were implemented by other educational institutes and academies in Arkhangelsk, Bryansk, Voronezh and other Russian cities.

As regards the Russian Academy of Sciences (RAS), its most important forest research

institutions include: the Institute of Forest named after V.N. Sukhachev under the RAS Siberian Branch in Krasnoyarsk (IUFRO Member), Institute of Biology and Soil Science under the RAS Far East Branch in Vladivostok (IUFRO Member), International Institute of Forest in Moscow, RAS Centre for Ecology and Forest Productivity, RAS Institute of Forest Science (formerly, the Laboratory of Forest Science, Moscow Oblast), Institute of Forest of the RAS Ural Branch (Yekaterinburg), Institute of Forest of the RAS Karelian Research Centre (Petrozavodsk), USSR (now, Russian) Research Institute of Agroforestry (Volgograd) and other centres (Тепляков, Бергер, 1994; Рослесхоз 2012). IUFRO Member Organisations (the number in the list of IUFRO member organisations is shown in brackets).

Non-governmental organizations are eligible to become IUFRO members, and individual scientists may join IUFRO as associated members if they were from non-member organizations.

It is worthwhile to name the most dedicated and distinguished forest scientists among the latter: V.A. Usoltsev (from Urals State Forestry Engineering Academy, Yekaterinburg), V.Yu. Neshataev (St. Petersburg State Forest Technical Academy), V.Yu. Neshataeva (Institute of Botany named after V.L. Komarov, St. Petersburg) A.B. Yastrebov (St. Petersburg State University), N.V. Starova (Botanical Garden, Ural Branch of RAS, Ufa), I.A. Yakovlev (Volga State University of Technology, Yoshkar-Ola), A. Sirin, A.P. Laletin (Friends of Siberian Forests NGO, Krasnoyarsk). Among the associated IUFRO members, there are our compatriots, based abroad, e.g., Mikhail Kozlov (Finland).

IUFRO events in the USSR/Russia (1980-1990)

Since long ago, Russian/Soviet scientists have been participating in IUFRO conferences, Congresses and projects (e.g., in international forest seed trials of various geographical provenances), but there was a long period when political barriers[314] impeded fruitful cooperation between IUFRO and our country. Another hurdle was the paucity of IUFRO member organizations in the country (see Table above): in the early 1980s, there were only 3 IUFRO member organizations in the USSR (Мелехов, Моисеев 1982), including the *Silava* Research and Operation Association in Latvia. Nevertheless, the efforts of the older generations of forest scientists, starting from G.F. Morozov, followed by V.N. Sukachev and I.S. Melekhov, and later by N.A. Moiseev and A.S. Isaev, were multiplied by successes of Soviet and Russian forest science and practice and found an echo on the other side. In this context, it is necessary to mention Walter Liese, IUFRO President.

I.S. Melekhov and N.A. Moiseev wrote in their article, prepared on the 90th IUFRO anniversary: "The format of our country's participation in IUFRO activities is gradually broadening. At the initiative of leaders of the USSR State Forestry Committee, on September 13-22, 1980, VNIILM and its Caucasian Office hosted a Meeting of the IUFRO Executive Board. The IUFRO management commended the hosts for the high technical level of the meeting organization and field visits, and awarded the organizers (the USSR State Forestry Committee, VNIILM and its Caucasian Office) with the first IUFRO Letters of Appreciation. In addition to the Executive Board Members, the Directors of Forest Research Institutes and lead scientists attended the meeting from the USSR and some socialist countries. The Meeting Agenda included presentation of the IUFRO Report for 1979 and its Work Plan for 1981, discussion of the preparation for the 17th IUFRO Congress and its Program; and discussion of cooperation with other international organizations (Мелехов и Моисеев 1982, p.130). Perhaps, the acquaintance with the USSR's forest science and forest research capacity

[314] Many events were conducted separately by the two political systems, even if they were thematically neutral events such as botanical congresses (e.g. the VIII Dendrological Congress of Socialist Countries in 1982) (Лапин 1982).

impressed the IUFRO President and made him keen to know the country better: ten years later, Professor Walter Liese with his co-author published an article about oak dieback in southern regions of the USSR (Balder and Liese 1990).

[The participants of the IUFRO Executive Board meeting held in Sochi, USSR in 1980. From left to right: N.A.Moiseev, W.Liese, T.A.Melekhova, I.S. Melekhov and V.S.Kholiavko. Courtesy of W.Liese.]

In the following year, in recognition of the role of our forest entomology research, it was decided to hold an international workshop to discuss the role of plant/insect relations in the forest pest population changes, and it took place in Irkutsk on August 24-28, 1981 (Роль взаимоотношений…1983). It was hosted by the Institute of Forest of the Siberian Branch of the USSR Academy of Sciences as supported by the USSR State Forestry Committee, IUFRO and Soviet Committee for the UNESCO Man and the Biosphere Program. A major contribution into this event was made by A.S. Isaev who was at that time the Director of the Institute and Co-Chair of the Presidium of the Krasnoyarsk Office of the Siberian Branch of the USSR Academy of Sciences.

In September 1985, an Interdivisional Conference on Thinning was held in Pushkino, Moscow Oblast, and Riga, Latvia. It was hosted by VNIILM, supported by the USSR State Forestry Committee. N.A. Moiseev, VNIILM Director of that time, was an active promoter of the collaboration between the USSR and IUFRO (Проблемы рубок… 1987). The Conference was attended by Dusan Mlinsek, IUFRO President of that time, and co-chaired by Carl-Johan Bredberg from Sweden. Thinning has been in the focus of IUFRO efforts since the first years of its existence because thinning operations are an integral part of any system of silvicultural, economic and

technical activities in the forest. In view of the significant contribution of our forest scientists into addressing the need to grow high-quality tree stands, the Conference generated great interest among scientists and specialists in other countries who came to Pushkino to share their opinions about how to organize, mechanize and improve techniques of thinning operations, make them more and efficient, and enhance their role in cultivation of high-yield and high-quality stands.

Dusan Mlinsek, IUFRO President at that time, found the organization of the Conference praiseworthy and reported that it had brought together over 80 participants from 17 countries of Central Europe, Scandinavia, North America, Great Britain, etc. and offered 40 presentations and numerous discussions in different languages (Mlinsek 1985, p.5). In Riga (September 13-15, 1985), the Conference continued its work, which brought together more than 100 participants.

In August 1989, the V.N. Sukachev Institute of Forest of the Siberian Branch of the USSR Academy of Sciences hosted an international symposium on forest insect guilds (titled: *Forest Insect Guilds: Patterns of Interaction with Host Trees*). It was held in Abakan, Krasnoyarsk Kray. Its organization was supported by the USSR State Forestry Committee and five Working Parties of IUFRO Division 2. Its proceedings were published in English by the USDA Forest Service (Baranchikov *et al.* 1991). The Symposium brought together more than 70 scientists from 12 countries (UK, Germany, Denmark, Norway, USSR, USA, Finland, France, Czechoslovakia, Switzerland, Sweden, and Japan). It offered 44 presentations on theoretical aspects of interaction between phytophagous insects and host trees as well as on behaviours of active and passive phytophagous.

In September 1989, a conference on "Harvesting and Utilization of Greenery" was held in Salaspils[315] (Latvian SSR) under the leadership of the IUFRO project group P3.05-00. The growing interest in this subject is due to the desire of replacing the chemical products by natural ones. In the USSR, this question had quite long and successful history of development and problem solving in this field (Проблема использования 1984, Левин и Репях 1984). At the Congress in Ljubljana (1986), at the request of the USSR delegation, IUFRO established a research group on the full utilization of tree crowns biomass, in particular, wood greens. Dr. M.O. Daugavietis, Head of the Laboratory at the Latvian Research Institute of Forestry Problems, *Silava* Research and Operation Association (a IUFRO member organization since 1980) became the chair of the new research group (Иевинь 1990). At the conference, "the participants discussed the impact of the tree crown biomass removal on forest ecosystem, the latest results of analyses of the chemical composition of wood greens, harvesting technology and processing of wood greens, as well as the extent of the application of new products and drugs of wood greens in various fields of national economy" (ibid, p.6).

In September 1989, another IUFRO symposium took place in Voronezh in the Central Research Institute of Forest Genetics and Breeding. It was focused on forest genetics, breeding and physiology of woody plants (Лесная генетика… 1989). The proceedings of the symposium aroused such a great interest that it necessitated printing additional copies of them in the following year. Russian experts in forest genetics were very well prepared for the international symposium; as a year before it, the same Central Research Institute of Forest Genetics and Breeding hosted a nationwide meeting of scientists and practitioners to discuss the development of genetics and breeding for silvicultural purposes (Развитие генетики 1988). The success of that Symposium might play its role in the accession of the Institute to IUFRO in 1990.

IUFRO events in Russia (1991-2000)

In August 1991, the Sukachev Institute of Forest and Wood of the Siberian Branch of the USSR Academy of Sciences and IUFRO Division 2 organized an international symposium on

[315] A city is located 18 km Southeast of Riga.

ecological physiology of conifers (Экологическая физиология… 1991). It took place in Abakan, Krasnoyarsk Kray, and brought together scientists from different countries. Its discussion was focused on such aspects of ecological physiology of conifers as gas exchange, mineral nutrition, water balance, metabolism and effects of various stresses on them (low temperatures, water and air regimes, and anthropogenic pressures).

In September 1992, VNIILM hosted an international Conference on integrated sustainable multiple-use forest management under the market system. It was supported by the State Forest Committee of the Ministry of Environment and Natural Resources of the Russian Federation and IUFRO Divisions 4 and 6 (Интегрированное управление… 1993). That Conference was held after the USSR disintegration in the rapidly changing world, and, therefore, aroused immense interest. Over 60 participants from across Russia and from European countries and the USA met to discuss principles and arrangements of sustainable multiple-use forest management under market conditions. Its proceedings were published in English in Denmark owing to the support from H. Fred Kaiser from the USA, Coordinator, Division 6, and Niels E. Koch from Denmark, Deputy Coordinator, Division 6, who took an active part in the preparation of the Conference and publishing of its proceedings in his Institute (Integrated… 1992). Sustainable forest management planning and decision-making are highly relevant for most countries, and were of particular importance for Russia in the beginning of its movement towards the market economy. To improve the efficiency and effectiveness of forest management, in particular, many countries try to strike a balance between public and private benefits from sustainable multiple forest use. In that context, it was critical to find ways to monitor forests on a continuous basis. To do so, it is necessary to address both technical issues and informational specifics, including active cooperation with all stakeholders of this process.

The Conference was very responsive to the challenges of that time and enabled to identify the scope of top-priority issues, involving the best research resources. However, the country's research capacity was utterly disrupted; Professor N.A. Moiseev described it as follows: "Now, we should try to save our science rather than to develop it. Particularly, this refers to fundamental studies. The penury of subsidies for research makes our future dependent on the market". The Conference provided a starting point for the preparation to a follow-up event through highlighting the most relevant and important issues such as linkages between economy and legislation and forest ownership and tenure patterns.

In May 1993, another international meeting took place in Moscow under the auspices of IUFRO Division 2 (S2.04-02): it was an international symposium on marketing of forest products and valuation of non-market forest benefits. The meeting reviewed the impact of pricing factors on forest products, valuation methods for non-market forest benefits and costing of goods in the forest market during transition, etc. (Маркетинг… 1991).

In August 1993, the Sukachev Institute of Forest (Siberian Branch of the Russian Academy of Science) hosted a symposium on the ecology and evolution of gall-forming insects. It was held in Krasnoyarsk, and the USSR State Forestry Committee, IUFRO Division 2 and USDA Forest Service provided support for this event. The proceedings of the symposium were published in English (Price, Mattson & Baranchikov 1994). The event brought together over 50 scientists from many countries, including Australia, Belgium, Brazil, Hungary, Germany, Russia, USA, Ukraine, Finland, Czechia, South Africa, South Korea, Japan. There were 22 presentations, covering such aspects as gall insect biology, ecology and population changes; impact of external physical environmental factors on the ecology of gall-forming insects; biological diversity and distribution of insects; explicit specifics of their interdependence with host trees and genetic variation of host trees; and prospects for evolution of gall-forming insects.

In June 1994, the second IUFRO-led conference was held in Pushkino, Moscow Oblast, to

discuss economic and legal aspects of forest management. It was hosted by VNIILM, and the Federal Forestry Service of Russia (Экономические и правовые… 1994) supported this endeavour. The Conference drew attention of both Russian and foreign research people and specialists. It was held upon adoption of the 1993 Framework Forest Legislation of the Russian Federation; and therefore, many issues were discussed from the perspective of the new legal and economic approaches to old problems of forest use and management. It is noteworthy that its proceedings were published owing to the support from Franz Schmithüsen, Coordinator of a Working Party of IUFRO Division 6, and IUFRO Board Member, who took an active part together with VNIILM in the preparation of the Conference. He also published the proceedings in his institute – the Swiss Federal Institute of Technology Zurich (ETH). It should be noted that the Conference Proceedings were published under somewhat different title (*Experiences with public forest ownership and joint management systems: proceedings of the IUFRO Forestry Conference* [on Economic and Legal Aspects of Forest Management], Pushkino, Moscow Region, Russia, June 1994, 1996). The participants of the Conference adopted a respective resolution.

In June 1996, an international conference on forest genetics and breeding was held in Voronezh under the title: 'Genetics and breeding for the benefit of forest'. It was hosted by the Research Institute of Forest Genetics and Breeding, with its efforts supported by the Federal Forestry Service of Russia and guided by IUFRO. The Conference participants came from various regions of Russia and from abroad. Its numerous presentations highlighted a broad range of topics from form diversity of the Karelian birch in Voronezh and Belarus to survival of provenance study plantations in the Angara region and conifer seed breeding in Siberia. A special attention was given to genetic and breeding efforts within the permanent forest seed supply sites and impact assessment of individual, family and interfamily selection. Abstracts of the papers were published in Russian and in English, and full texts of the papers were published a year later (Генетика… 1996, 1997).

In September 1996, VNIILM held its third IUFRO conference in Pushkino to discuss planning and decision-making for forest management in the market economy (Планирование… 1996). The Conference brought together 40 scientists and specialists from 10 countries of North America and Europe, IUFRO, Russian ministries and agencies, research institutes, universities and non-governmental organizations. Gottingen University and Professor Klaus von Gadow (Coordinator of IUFRO Division 4 at that time) rendered great assistance in publishing its Proceedings in English (*Planning and decision-making for forest management in the market economy*, 1997). The participants of the Conference repeatedly emphasized that a new approach to address the existing problems should build upon sophisticated interdisciplinary linkages of multiple-use forest management. Therefore, the papers explicitly showed the exclusively important role of planning as well as the ability to combine planning elements with market approaches to forest management. Virtually, it implies a return to the basics of forest management planning as described by M.M. Orlov, 75 years ago in his classical three-volume publication on forest inventory and management planning and also in the fourth (last) volume. In the preface, he says that forest management planning is dead unless the plans are implemented, and forest management is blind unless it is planned (Орлов, 1930). Certainly, a key factor is impact of adopted decisions on achievement of policy, social and environmental objectives of forest management under the market conditions and evaluation of the impact (Моисеев и Бурдин, 1996).

In September 1998, Krasnoyarsk hosted a major larch symposium of the twentieth century. Larch accounts for about 40% of the forested land area in the country; no other tree species covers such a large area in Russia. Larch forests play an important role in the European and North American economies, with their significance increasingly growing, owing to the high quality of the wood, rather high growth rates, high resilience and resistance to natural and anthropogenic stresses and

their accessibility in Northern Asia. The first successful international symposium under the title: *Ecology and Management of Larix forests: A Look Ahead* had been held in the USA in 1992 and revealed the need to hold such meetings on a regular basis (Ecology and management… 1992).

The interdisciplinary IUFRO symposium (LARIX-98: World resources for breeding, resistance and utilization) was held on September 1-5, 1998 at the initiative of the Siberian Branch of the Russian Academy of Sciences and the Forest Research Council of the RAS. It was organized and hosted by the Sukachev Institute of Forest (Siberian Branch, RAS) jointly with the Siberian International Centre of Boreal Forest Ecology Research, Siberian University of Technology and Forestry Committee of the Krasnoyarsk Kray. The Symposium brought together more than 100 scientists from 7 countries (Sweden, Norway, USA, Canada, Japan, Island, and Russia). About 60 presentations and 40 posters were offered by scientists from IUFRO Divisions – D 2 *Physiology and Genetics*, D5 *Forest Products*, and D7 *Forest Health*.

Participants of the Symposium were very glad to receive a joint publication of Russian and Swedish scientists on variability and ecology of Siberian larch varieties (Abaimov *et al* 1998). The Symposium included visits to the *Pogorelskiy Bor* experiment station of the Institute of Forest and provenance study plantations of larch, the Krasnoyarsk Power Plant and larch forests in the low hills of the Eastern Sayan Mountains. After the Symposium, 9 participants from Scandinavia went to Bratsk for a five-day tour to see uneven-aged Siberian larch stands (*Larix sibirica*) and to get acquainted with the technology for industrial production and downstream processing of larch wood. North American participants went to southern parts of Central Siberia to visit larch forests in Khakassia, Tyva and Western Sayan Mountains where they also visited Siberian pine forests (Milyutin & Muratova 1998).

IUFRO events in Russia (2001-2016)

In 2001, upon consent of IUFRO, an Association of Russian IUFRO Member-Organizations was established under the Moscow State Forest University. It is designated to make Russian involvement in IUFRO activities more productive and to increase visibility and prestige of Russian forest research. The Association's functions are to coordinate and integrate activities; manage efforts to 'recruit' new members for IUFRO; design, update and maintain *IUFRO in Russia* website; promote new ideas and establish new IUFRO working parties. The Association requested the Moscow State Forest University to coordinate activities of Russian IUFRO member-organizations, and, for these purposes, to update and maintain IUFRO *in Russia* website (http://www.iufro.ru).

In 2003, the Russian Federation hosted a meeting of the IUFRO Management Committee for the first time. The efforts to prepare it were actively supported by the Moscow State Forest University, VNIILM and Institute of Continuous Education in Forestry (VIPKLKh). Prior to that, a meeting of such a high level had been held in the USSR only once – in 1980 when Moscow and Sochi hosted the meeting of the IUFRO Executive Board. The meeting of the IUFRO Management Committee took place in the premises of VNIILM and VIPKLKh on May 17-21, 2003. In addition to the scheduled discussions, the event included meetings with the management of the Federal Forestry Agency and management of research and educational institutions of the Russian forest sector (on May 19, 2003, in the VNIILM office) to evaluate and discuss inputs of Russian organizations and scientists in IUFRO work, identify ways to consolidate such efforts with due regard to IUFRO capacity and other matters. In addition, participants of the meeting visited forest management sites in the Sergiev Posad Experimental *Leskhoz*, took a sightseeing tour to get acquainted with cultural heritage of Russia, and planted trees in VNIILM's arboretum. IUFRO awarded VIPKLKh and VNIILM with its Certificate of Appreciation for preparing and hosting the meeting; and at the individual level, Certificates of Appreciation were issued for V.K. Teplyakov

(Moscow State Forest University) and A.E. Droskov (VNIILM). In the same year, the IUFRO Executive Board adopted the decision to grant Academician N.A. Moiseev the IUFRO's DSA.

In October 2004, the Regional Coordinating Council of Wood Science (RCCWS) held the IV International Symposium on Wood Structure, Properties and Quality, in St. Petersburg. The RCCWS brought together wood scientists from 10 Eastern European countries. The Symposium, led by IUFRO Working Party 5.09, was held one week before the IAWS/IAWA meeting in Montpellier, France. Almost 150 people took part in the Symposium, and many of them attended both of the events. The Symposium discussed issues, related to wood anatomy, physiology, tree rings, wood properties and conservation technology to protect wood against insects and fungi, as well as biotechnology-related issues, goods and constructions, made of wood, etc. The Symposium Proceedings contain over 220 papers, prepared in Russian and in English by scientists from Belarus, Brazil, Bulgaria, China, Czechia, Estonia, Finland, France, Georgia, Germany, Hungary, Iran, Japan, Kyrgyzstan, South Korea, Latvia, Norway, Poland, Portugal, Russia, Slovakia, Switzerland, Sweden, Ukraine and USA. The Symposium Proceedings in two volumes (on 588 pages) under the editorship of B.N. Ugolev (1925-2005) were published by the St. Petersburg State Forest Technical Academy in 2004 (Chubinsky 2004).

[Participants of the IUFRO MC meeting during the field excursion, Sergiev Posad, May 20, 2003. From left to right: S.V. Denisenko, S.A. Rodin, N.A. Bondar', D.K. Lee, J. Burley, G. Bacon, A. Luhtala, V.K. Teplyakov, R. Seppälä, E. Teissier du Cros, H. Schmutzenhofer, J. Innes, B.K. Soloviov, S.N. Volkov, M.N. Linicheva, A.E. Droskov. Courtesy of V.K. Leonov.]

In 2006, The Moscow State Forest University joined its efforts with VNIILM and the Sukachev Institute of Forest to launch the Russian Segment of the Global Forest Information Service (GFIS-Russia). The decision to put it in place emerged from the need to improve access to available information in the Russian language for the community of forest specialists, based abroad. Several international meetings were held to discuss the design, contents, linguistic specifics and other format-related aspects of the system (http://gfis.ru). Provided with financing from the Swiss Agency

for the Environment, Forests and Landscape[316] and IUFRO, the above Russian Institutes launched the project, aimed at: (i). providing access to forest-related information resources available on the Internet to support sustainable forest management in Russia; (ii) facilitating exchange of knowledge and experience among the forest community, universities, forest research institutes, the Academy of Science, non-governmental organizations, business communities, etc.; (iii) improving access to information about applied and fundamental forest research and forest education in Russia; and (iv) establishing a network for partnerships between Russia and other countries and international organizations, addressing forest issues (Mikkola 2006). Most valuable assistance in GFIS-Russia development was rendered by Dr. Ho Sang Kang from the Seoul National University (South Korea) who was going through his postdoctoral programme at the Moscow State Forest University at that time and then continued to cooperate with us in his capacity of the GFIS Regional Coordinator for Asia and Russia (Kang 2007). In 2009, Professor Valentin S. Shalaev, GFIS-Russia Project Manager, was awarded with the IUFRO Certificate of Appreciation for his excellent contributions in promoting IUFRO activities in Russia and his dedication to GFIS-Russia.

In August 2007, the West-Siberian Office of the Sukachev Institute of Forest hosted the 1st International Conference on Conservation of Forest Genetic Resources in Siberia (July 30 – August 4, 2007, Barnaul, Russia). Owing to the high priority attached to conservation of forest genetic resources in Siberia, the Conference was supported by the Altai Forest Management Department, *AltaiForest* Company Ltd., Ministry of Natural Resources of the Republic of Altai, Forest Health Centre, Texas A&M University and IUFRO. The Conference brought together about 90 people from Russia, Belarus, Bulgaria, Italy, Slovakia and USA. It was dedicated to the memory of the outstanding forest geneticists, and its speakers made 71 presentations, covering the following themes: (i) words in memory of outstanding forest geneticists and breeders; (ii) traditional methods of genetic studies and conservation; (iii) methods of molecular genetics and biotechnology for studies, conservation and management of forest genetic resources; (iv) genetic basis for forest tree improvement and seed production; and (v) forest genetic and breeding sites.

In June 2009, the International Academy of Wood Sciences (IAWS) and the Regional Coordinating Council of Wood Science (RCCWS) held a joint plenary meeting and a conference, hosted, respectively, by the St. Petersburg Forest Technical Academy in St. Petersburg, and by the Moscow State Forest University in Moscow, and supported by IUFRO Division 5. The Conference had the title: '*Wood as a Renewable Source of Vital Values for the Changing World'*. The Conference offered about 130 presentations and posters, prepared by more than 120 participants from 21 countries of Europe, Asia, America and Africa. Its papers and posters covered a broad range of topics and issues, including ecology, impact of forest site conditions and silvicultural treatments on the quality of wood, tree ring width variation, wood structure in nano-, micro-, meso- and macro-scales, wood chemistry, physical and mechanical properties of wood, wood defects and conservation, standardization, technology, wood-based composite products, wood in construction, bioenergy, etc. (Nikitin 2009; IAWS 2009).

In August 2009, the 2nd International Conference on Conservation of Forest Genetic Resources in Siberia was held in Novosibirsk and was dedicated to *Genetics of Resistance and Productivity under the Conditions of Anthropogenic Effects and Global Climate Change*. The Conference was organized by the Forest Research Council of the Russian Academy of Sciences, Sukachev Institute of Forest, Department of Natural Resources and Conservation of the Novosibirsk Oblast, IUFRO and other organizations. The overarching purpose of the Conference was to create an informal research network in support of the development of a good common strategy of conservation and sustainable use of forest genetic resources in Siberia. The Conference brought

[316] Swiss Agency for the Environment, Forests and Landscape - SAEFL

together more than 100 people, including 70 scientists from Russia, Bulgaria, Italy, Austria, as well as representatives of Russia's government agencies, forest institutions and companies. It offered 72 presentations and 2 field visits to conifer genetic and breeding sites in the Novosibirsk Oblast (Итоги… 2007).

In September 2010, the Institute of Biology, Komi Science Center, Russian Academy of Sciences, hosted the 7th International Symposium - LARIX 2010 (September 7-11, 2010, Syktyvkar). The previous LARIX symposia had been held in the USA (1992), Sweden (1995), Russia (Krasnoyarsk, 1998), France (2002), Japan (2004) and Canada (2007). Twenty scientists from 8 countries (Canada, Czech Republic, Finland, France, Japan, Norway, Russia and Sweden) gathered in Syktyvkar. There were 15 presentations, covering a wide range of theoretical topics related to genetic variability of larch species, structure of larch populations, hybridization, physiology, as well as practical aspects, related to the quality of wood, its defects and larch cultivation. Significant attention was given to genetic variability of adaptive capacity. The Symposium resulted into the agreement to share seeds for the establishment of provenance study plantations in participating countries. The event was of particular importance for Russia because larch forests occupy 280 million ha or 37% of Russia's forest area (Fedorkov 2010).

In November 2010, the second GFIS-Russia workshop was hosted by the St. Petersburg State Forest Technical University (November 2-3, 2010, St. Petersburg). It was organized by IUFRO with the following aims: to put in place the gateway (http://www.gfis.net), to provide contents for the RSS2.0 web-publication channel, and to discuss ways of expanding the network of Russian partners. The workshop was supported by the Korean Forest Research Institute (KFRI) and the Moscow State Forest University; it was attended by about 20 specialists from the St. Petersburg State Forest Technical University, Moscow State Forest University, KFRI, as well as from the St. Petersburg State Technological University of Plant Polymers, *Gelinatus* Technical Innovation Centre, St. Petersburg Forestry Research Institute, Lisino Forest College, *Akonit OOO* Company, Petrozavodsk State University and Western Office of the *Roslesinforg* (Forest Information, Inventory and Planning) Institution. The main conclusions of the workshop were that the first phase of the GFIS Russia project had created a good basis for forest information promotion by Russian partners to the global forest community via the GFIS gateway. The second phase of the project should be established to ensure current information provision and get new information and regional partners from Russia to share their information via GFIS (Mikkola 2010).

In August 2011, Tomsk became the venue of the 4th International Conference on Breeding and Genetic Resources of Five-Needle Pines (August 9-12, 2011). The Conference included a tour to Altai (August 13-19, 2011) to show various types of Siberian pine forests, testing plantations of the Siberian pine, and other sites. The desire to know more about the five-needle pines has been ever immense which is accounted for by the high value of their wood and seeds and by their biological and environmental values. The Siberian pine, Korean pine and other of about 40 species occur over a range, stretching from Mexico to Japan. The Conference was organized by the Institute of Monitoring of Climatic and Environmental Systems of the Siberian Branch of the Russian Academy of Science and the Tomsk Oblast Administration together with IUFRO. Its participants discussed various aspects of genetic ecology and conservation biology, population and evolutionary genetics, genomics, genetics of quantitative properties, breeding for productivity and resistance to pests, etc.

The previous Conferences were held in the USA, Romania, and Korea. Scientists from Russia, Austria, USA, Canada and South Korea attended the Conference. According to Dr. Bulgakova (Булгакова 2011, p. 11), the total range of the three Russian five-needle pines, including the Siberian pine, is as vast as 11.6 million km^2! It is 2.5 times larger than the total area of all the other species put together. The Siberian pine forests are, undoubtedly, the most 'smart' and productive forests in the Siberian and Far East ecosystems, they are our national treasure and pride.

In August 2011, the Sukachev Institute of Forest hosted the 3rd International Conference on Conservation of Forest Genetic Resources in Siberia (Krasnoyarsk, August 23-29, 2011). It was organized by joint efforts of the Sukachev Institute of Forest, Forest Research Council of the Russian Academy of Sciences, Ministry of Natural Resources and Forest Sector of the Krasnoyarsk Kray, Siberian University of Technology, Russian Forest Health Centre, IUFRO and other organizations. The major objective of this Conference was to continue developing an informal scientific community that would help to produce an efficient strategy for conservation and sustainable use of forest genetic resources in Siberia, Urals and the Far East. The organizers continued good traditions, established by the 1st and the 2nd Conferences, held the Altai Kray (2007) and in Novosibirsk (2009). That Conference was timely and essential to address the lack of knowledge about the population genetic structure of predominant boreal forest species in North-Asian part of their range, especially in taiga, and about the impact of anthropogenic pressures and climate change. The Conference also considered the importance of boreal forests for the processes in the biosphere, identified existing problems in forest conservation genetics, and discussed traditional and molecular methods of the genetic analysis and the need of their synergetic application for forest tree improvement. It also recommended broadening and improving the use of forest genetic resources for the benefit tree breeding. The recommendations were reflected in Conference Resolution (Муратова и Милютин 2011). The Conference brought together 120 experts from Russia, Hungary, Poland, USA, China, Estonia, Norway, Abkhazia, Belarus, Ukraine, Kazakhstan, Austria, Makedonia, Latvia, and Mongolia. It offered 73 presentations and 30 posters (Сохранение… 2011).

In November 2011, the St. Petersburg State Forest Technical University hosted an international conference, titled *Ecosystem Design for Multiple Services – with an emphasis on Eurasian Boreal Forests* (St. Petersburg, November 9-11, 2011), organized by joint efforts of IUFRO, European Forest Institute, Moscow State Forest University and International Centre of Forestry and Forest Industries. The objective of the Conference is to bring together expertise relating to sustainable use of the Eurasian boreal forests. The Conference discussed such issues as resource assessments, including remote sensing and GIS; boreal forest ecology and disturbance; planning and design of large-scale field experiments; ecosystem design for multiple services; boreal forest growth and yield modelling; economics of boreal non-timber products; and how to increase the forest revenue (СПбГЛТУ 2011).

In early June 2012, the St. Petersburg State Forest Technical University hosted another international conference, which was titled: *Renewable Forest Resources: Innovative Development in Forestry* (St. Petersburg, June 6-8, 2012). It was organized by the St. Petersburg State Forest Technical University, supported by the Federal Forestry Agency, IUFRO Divisions 1, 2 and 5 and the European Forest Institute (EFI). Its participants discussed various aspects of forest resource use and presented Russian and international experience with innovative methods of forest management, reforestation and use of forest resources[317]. The conference brought together representatives from the Federal Forestry Agency, professors, graduate and PhD students and specialists from forestry universities and research institutes from Russia, Lebanon, Poland, Portugal, Finland, France and other countries. Over 30 reports were presented. The adopted resolution encouraged the Russian Academy of Sciences (RAS) and the Ministry of Education and Science of the Russian Federation to promote and support new areas in research and innovation such as biogeotechnology in respective RAS institutes and universities.

In June 2012, the Volga State University of Technology hosted an international workshop to discuss the impact of extreme weather on natural, socio-economic, and land-use systems with a focus on the 2010 summer anomaly in the Volga Region (Yoshkart-Ola, June). It brought together

[317] http://www.iufro.org/science/divisions/division-5/50000/activities/ ; http://onlinereg.ru/RR2012/

78 scientists and experts, including 16 foreign specialists from the USA, Italy, Greece, Spain and Kazakhstan. It was organized in partnership with the NASA (USA), IUFRO Division 8, GOFC-GOLD/NERIN[318] (FAO), *ScanEx* Research and Development Centre (Moscow) and European Forest Institute and with information support from Moscow company "*Sovzond*" (Влияние… 2012). The meeting participants concluded that the scientific community had built a solid basis by summarizing the biophysical conditions that had led to the development of extreme drought of 2010 and observing the direct impact of the drought on forest and agricultural systems; however, there is a need for more research to enhance our understanding of the impact and to explore approaches to mitigate similar events in future (Krankina 2012, p. 4).

In late May 2015, the XXXVI International Conference of the CIOSTA (Commission Internationale de l'Organisation Scientifique du Travalen Agriculture)[319] and Section V of the CIGR (Commission Internationale du Genie Rural)[320] held a meeting in Saint Petersburg to discuss Environmentally Friendly Agriculture and Forestry for Future Generations. It was the first meeting of this Organization which was held in Russia. It was convened at the initiative of foreign scientists in agriculture and forestry, engineering, economics, scientific organization of labor and education. The Conference was organized with inputs from the Russian Academy of Sciences and the Ministry of Agriculture of the Russian Federation in partnership with the Saint Petersburg State Agrarian University, North-West Research Institute of Agricultural Engineering and Electrification, Saint Petersburg State Forestry University and the Northwest Research Center of the Russian Academy of Agricultural Sciences and Association of Field Research and Rural Development. The Conference was attended by 244 scientists from 29 countries. The Scientific Committee of the Conference selected 364 out of 424 abstracts submitted from 43 countries. There were 148 verbal presentations of reports, with 55 of them made by Russian participants; and 65 posters were presented. In addition to the plenary session, there were 24 thematic sessions which covered 11 specific areas. Two professional excursions were organized. Approximately 260 abstracts were included in the Conference Proceedings (over 600 pages) (Овчинникова 2014; Голохвастова 2015).

In late August 2015, the 4th International Conference on Conservation of Forest Genetic Resources in Siberia was held in Barnaul. The Conference was organized by the Scientific Council of the Russian Academy of Sciences (RAS) on Forest, Russian Federal Forestry Agency (FFA), Russian Forest Health Center (*Roslesozashchita*), RAS Scientific Council on Genetics and Breeding, Vavilov Society of Geneticists and Breeders (VOGiS), International Union of Forest Research Organizations (IUFRO), Sukachev Institute of Forest of the RAS Siberian Branch, Vavilov Institute of General Genetics of the RAS, Altai Natural Resources and Ecology Agency, Altai Forestry Agency, Altai Forest Health Center, Novosibirsk State Agrarian University, Altai State Agrarian

[318] GOFC-GOLD: Global Observations of Forest and Land Cover Dynamics (under the auspice of the UN FAO); NERIN: Northern Eurasia Regional Information Network.

[319] International Committee of Work Study and Labour Management in Agriculture = Commission internationale pour l'organisation scientifique du travail en agriculture (CIOSTA) established in 1950 in Paris (France) as a professional non-commercial organization aiming at developing the agricultural economy with a view to augmenting agricultural production, yield and quality, safety and ergonomics in agriculture. CIOSTA has members in 41 countries, including the Russian Federation, and holds its biennial congresses. http://www.uia.org/s/or/en/1100009422

[320] International Commission of Agricultural Engineering = Commission Internationale du Genie Rural (CIGR) was established in 1930 in Liege, Belgium. The mission of CIGR is "to serve – on a world-wide basis and through its members - the needs of humanity by fostering mutual understanding, improvement and rationalisation of sustainable biological production systems while protecting nature and environment and managing landscape through the advancement of engineering and allied sciences." The Russian Federation has been a member of the Commission since 1982. Section V: Management, Ergonomics and Systems Engineering is one of the CIGR's seven sections. http://www.cigr.org/

University, Siberian Federal University, University of Göttingen (Germany), and Institute of Computational Technologies of the SB of the RAS. The meeting brought together 76 participants from 35 research organizations. There were 59 verbal and 9 poster presentations. The Proceedings (220 pages) were printed prior to the meeting and included 110 abstracts in Russian and English for papers from Belorussia, France, Germany, India, Kazakhstan, Lithuania, Macedonia, Russia, Sweden, Turkey and the USA prepared by authors from 65 organizations based in 38 cities.

The Conference was focused on the development of an evidence-based strategy of conservation and sustainable management of forest genetic resources in Siberia, the Ural Mountains and the Far East. The Conference was structured around the following aspects: 1. Structure and trends of population gene pools, "relic" populations in the *refugium* area, forest genetic conservation in the context of global climate change and anthropogenic impact. 2. Sites for breeding, seed production and gene pool conservation: status, genetic identification, and selection of "elite" trees, and seed zoning. 3. Genetics and epigenetics of adaptive and breeding traits; breeding for resilience, aesthetic values, productivity and other valuable tree improvement traits. 4. Fast growing of selectively improved planting stock for forest plantations. 5. Conceptualization of a National Program of conservation and sustainable use of forest genetic resources. 6. Theoretical and methodical problems of research, conservation and sustainable use of forest genetic resources. Professional excursions were organized to breeding and seed production facilities and an Altai natural ecosystem. The Conference adopted a resolution and later received a positive response from the Russian Federal Forestry Agency (Тараканов и Крутовский 2016; Krutovsky 2016).

* * *

The last 50 years saw rather few IUFRO events, hosted by the USSR or Russia. It should be recognized that one of the main reasons for that is the small number of our research and education organizations which are IUFRO members; and it has been always stressed by our lead scientists and professors.

More than half a century ago, Academician I.S. Melekhov (one of the most consistent advocates of the country's broader engagement with IUFRO) deemed it expedient to cause several national research institutions to become IUFRO members in order to enhance international relations of national forest science (Мелехов и Чертовской 1961, с.171).

In his speeches and letters, he called leaders of forest science and education to be more proactive in causing our universities, fundamental and applied research institutions to join IUFRO as its member organizations. It is owing to his efforts (РМЛ 2014) that on October 1, 1976, Ivar Samset, IUFRO President, sent letters to Academician V.A. Kirillin (1913-1999) who was the Deputy Chair of the USSR Council of Ministers (since 1965 till 1980) and the First Chair of the USSR State Committee for Science and Technology[321] (since 1965 till 1980) and to N.V. Timofeev (1913-1988) who was the USSR Minister of Forest and Wood Working Industry (since 1968 till 1980)[322], referring to potential increase in the number of IUFRO member organizations from the USSR. In particular, according to the letters of Ivar Samset, IUFRO President, most countries of Europe and North America had from 3 to 10 IUFRO member organizations each; and Soviet scientists had mutually interesting discussions with their foreign peers during various IUFRO meetings. So, to enhance the cooperation he invited Soviet research organizations to join IUFRO.

Many years had passed before more than three Soviet institutions became IUFRO members. This issue of increasing the number of Russian IUFRO member organizations remains relevant.

[321] The State Committee for Science and Technology, under the of the USSR Council of Ministers.
[322] The Minister of Forest, Pulp and Paper and Wood-Working Industries of the USSR (1965-1968).

Conclusion

In 2017, IUFRO will celebrate its 125th anniversary. Russian scientists participated almost in all IUFRO Congresses, except for the first one in 1892 (due to the famine in Russia in 1892-1893), and the Congresses in the period of 1932-1953 (due to various reasons, including ideological ones). Nevertheless, in the course of all those years, Russian scientists took an active part in IUFRO activities though the number of involved Russian organizations and research officers, professors, postgraduate and graduate students remain rather limited.

In another publication of the authors of this book, they review this issue in detail and deem that publication still relevant. As a reminder, a senior forest official was questioning about the reasons for low participation of Russia in IUFRO (Academician I.S. Melekhov wrote about it in 1961). Probably, that high-standing official was not very well aware of IUFRO's nature or specifics and extent of participation of Russian research organizations in its activities. It is very difficult to give a brief answer to this question: the authors wrote the book to answer it. Below, we are providing a brief review of the situation and trying to articulate a concise response to the question.

IUFRO membership offers such important advantages and benefits as joint studies and partnerships with top forest research organizations of the world and lead international scientists; access to data of international studies; opportunities to participate in important IUFRO events, meetings, trainings, seminars, conferences and Congresses; opportunity to get support for participation in IUFRO events through IUFRO's Special Programme for Development of Capacities (IUFRO-SPDC); subscription for IUFRO News and access to special IUFRO publications, including global overviews of results from forest research and research in related disciplines, IUFRO special papers on standard forest terminology and participation in prestigious IUFRO support programs.

IUFRO engages the most active scientists with the highest performance who can define the status, progress and direction of forest research in the world, and hold the most authoritative positions in forest science. A chronological analysis of their participation in IUFRO activities and career growth testify to this effect. Such a relationship is doubtless, and the more so in view of the fact that involvement in IUFRO work and, particularly, participation in its World Congresses, is most conductive to new knowledge acquisition, open-mindedness and research capacity building, as well as to international positioning of the country.

Notwithstanding its old age, the International Union of Forest Research Organizations keeps growing and developing. Initially, it had consisted only of a few research institutions of Central European countries (Germany, Austria and Switzerland) whereas now, the number of IUFRO members exceeds 15,000 scientists from over 700 organizations of more than 110 countries. The IUFRO strategy of international cooperation is centred in its aspiration to bring together knowledge and expertise of all forest sciences, to ensure sustainable management and conservation of forest ecosystems for the benefit of local communities and society as a whole. The collective intellectual capacity of this think-tank, consisting of 10,000–15,000 experts cannot be but a powerful tool.

In the course of its integration into the global research community, Russia should consider findings and outputs of the International Union of Forest Research Organizations and draw from them to improve national forest research. In particular, the IUFRO Congresses had raised such issues as multiple use forest management, globalization, environmental and social benefits of forest ecosystems, greening of the future for our planet, long before they came in the focus of broader discussions. Though it should be noted that Russian scholars had also generated similar ideas in the

late 19th – early 20th century even prior to their discussion at meetings of the Association of Forest Experiment Stations and IUFRO Congresses.

In the best years, the number of IUFRO members from Russia reached 15 organizations, i.e., the target benchmark, set in Ivar Samset's letters in 1976 (10 organizations), was even surpassed. Nevertheless, the role of Russia's forest research in global development and, in particular, in IUFRO management bodies and units fails to match the role Russia's forests play in global economy, environment protection and social development. Currently, over 50 universities provide vocational education and training in forestry in Russia, and that is excluding education in related areas (such as ecology, biology, and agriculture); and there are dozens of applied research institutes of forestry and timber, pulp and paper and wood-working industries and forest research institutes under the Academies of Sciences. It is noteworthy that the list of IUFRO member organizations includes 15 organizations from Russia: 6 universities, 2 research institutes of the Russian Academy of Sciences, 5 (applied) forestry research institutes, 1 non-governmental organization and 1 business entity, but there are no institutions of timber, wood working and pulp and paper industries. So, there is a scope for further growth in the country's engagement. Will there be aspiration towards it? Obviously, to increase the number of IUFRO members from Russia and the number of Russia's representatives in the IUFRO management, and to enable the country to gain research prestige in the international community, it is necessary to intensify efforts of our organizations and scientists and to mobilize appropriate government support.

To effectively advocate or promote decisions, it is necessary to have a proactive standing in IUFRO elected bodies. Certainly, there are such dimensions as election-based rotation of leaders and changing landscape of the forest sector and the representation of different countries in the IUFRO management bodies is also changing, e.g., in the recent decade, at the level of IUFRO Divisions and Working Parties, the number of officeholders is 740-750 people. At all levels, the number of IUFRO officials from Russia is 5-7 or maximum 10 people (about 1%).

To enhance the role of Russia in various areas of IUFRO work, it was decided to establish the Association of Russian IUFRO Member-Organizations; and the Moscow State Forest University hosted the IUFRO in Russia website. Both the Association and the website are operating without remuneration. The goals and objectives of the Association are described on this Internet-resource.

In this context, it should emphasized that such a situation results, among other things, from the fact that Russian government officials from the forest sector do not attend IUFRO Congresses (with the rare exceptions in 1970-1980) though the international association of foresters was conceived as a club of forest policy-makers in their countries. Most forest experiment stations were subordinated to government agencies, the first President of the organization (Joseph Friedrich) was a forest ranger, and most IUFRO Presidents were Directors of Research Institutes or senior government officials.

For the same purpose, one may have a look at the composition of the IUFRO Executive Board in the early 1980s (Мелехов и Моисеев 1982): representatives from the national forest services of the USA (R.E. Buckman), Canada (J. Cayford), Brazil (A. Galvao) and Senegal (M. Sene Hadi); representatives from forest research institutes of West Germany (W. Liese), Malaysia (Salleh Mohd Nor), Switzerland (V. Bossard), Poland (Z. Patalas), USSR (N.A. Moiseev), Turkey (A. Semizogli) and Japan (S. Asakawa); University Professors from Yugoslavia (D. Mlincek) and Sweden (U. Sundberg), with three persons in this list being IUFRO Presidents in different years and one being a Vice-President.

A brief account of the numerous reasons shows that the most essential factor is lack of a well-balanced national forest policy, covering such critically important domains of the forest sector as

science, education and experiments. This triune is a cornerstone for the international community of foresters, called the International Union of Forest Research Organizations.

In 2006, a new Forest Code of the Russian Federation was adopted. From the perspective of forest science, it is the most unimaginable and unconceivable national Forest Code as it lacks both the concept and image of 'FOREST'. It also excluded such notions as 'a training forest management unit' and 'experimental forest management unit', which had been institutionalized by the Russian Forest Code, adopted in 1923, i.e., in the years of drastic changes in the country. It appears that unless all public authorities (including the legislators) pay appropriate attention to it, it would be hardly possible to expect forest research and even the occupation of forester to become more prestigious.

International positioning of Russian forest science (especially now) is very important for the image of our country in the eyes of the global forest community. To attain this goal, it is necessary to mobilize political will and government support. In the recent two decades, the government agencies of the forest sector (including forest management) have not been making major progress in broadening the scope for international cooperation and development of collaboration with IUFRO. The latest accession of a Russian organization to IUFRO was that of the St. Petersburg Forestry Research Institute in 1993. In view of this, we deem it important not only initiate accession and involvement of Russian research institutions in IUFRO, but also to broaden their participation in such significant international events as IUFRO World Congresses.

IUFRO has become an indispensable tool for forest experts, scientists and practitioners; and we hope that joint efforts of government institutions, universities, and research and business communities will enhance the role of Russia to the level, matching its forest resources, capacity and multi-century experience in the development of forest science and practice.

* * *

The authors of this book hope to see broader involvement of Russian forest organizations, research workers, practitioners, students, business people and non-governmental organizations in activities of the International Union of Forest Research Organizations, and proper representation of Russia in the international forest research community.

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Annexes

1. IUFRO Milestones

1890 - September 3: Motion for the establishment of the Union at the International Congress for Agriculture and Forestry (Vienna, Austria).

1891 - September 18: Preparatory meeting, Badenweiler, Germany
- Drafting the Statutes of the Union by Austrian, German, French, Hungarian and Swiss representatives at the annual assembly of the Association of German Forest Experiment Stations. Two official languages: German and French.

1892 - August 18: IUFRO Inauguration meeting, Eberswalde, Germany
- Establishment of the International Union (Association) of Forest Experiment Stations (Eberswalde, Germany) as an intergovernmental organization. Members: German Empire, Austria, Switzerland. Governing bodies: the General Assembly, and the Chairman (B. Danckelmann).

1893 - September 10-16: I Congress, Vienna, Austria (Friedrich)
- Standards for tree measurements were adopted, e.g. height and diameter in 1.3 m

1896 - September 19-24: II Congress, Braunschweig (Brunswick), Germany
- New participants: Hungary, Italy, Russia and Sweden.

1900 - September 4-11: III Congress, Zurich and Bern, Switzerland
- The IUFRO Congress had already 22 delegates.

1903 - August 31-September 5: IV Congress, Vienna, Austria
- The corresponding membership was introduced; any language for presentations was permitted.

1906 - September 8-16: V Congress, Stuttgart and Ravensburg, Germany
- 14 countries participated in IUFRO.

1910 - September 10-19: VI Congress, Spa and Brussels, Belgium

1914 - July 28: The Great War/La Grande guerre began (later named World War One).
- The Congress scheduled to be held at Budapest, Hungary, September 7-17, was cancelled.

1926 - Decision at the First World Forestry Congress (Rome, Italy) to reactivate IUFRO (motion by Denmark) and prepare the Seventh Congress of IUFRO.

1929 - July 14-27: VII Congress, Stockholm, Sweden: the new presentation of the Union
- Confirmation of a reactivation, reorganization, change of the name at the Congress. English became the third official language of IUFRO.
- New name of the Union: Internationaler Verband Forstlicher Forschungsanstalten/The International Union of Forestry Research Organizations/Union internationale des instituts de recherches forestières.
- Revision of the Statutes. In addition to the General Assembly (Congress) and the Chairman (President), the following new governing bodies were introduced: the International Committee (representing 33 member countries), Permanent Committee (for coordination), Secretary General (Bureau).
- Congress papers were distributed among the four Research Sections.
- The Union became an open organization. Universities could join. Two classes of membership were adopted: Ordinary Members and Associated Members. Ordinary

Members were government-established Forest Research Organizations and their staff, and organizations carrying similar kind of work.

- "The residence of the Secretary General shall be legally considered as the seat of the Union" (Article 9, paragraph 4 of the Statutes); the IUFRO Secretariat moved from the seat of the last President (Helsingfors) to Stockholm, Sweden (Secretary General – S. Petrini).
- For the first time, representatives from all the continents participated in the Congress.
- For the first time, a woman was registered as a Congress participant – Erika Goldbach (Prague, Czechoslovakia).

1932
- September 4-11: VIII IUFRO Congress, Nancy, France.
- At the Congress, the work was organized in six Research Sections: 1. Forest Ecology and Silviculture; 2. Forest Utilization; 3. Tropical and Mediterranean Problems; 4. Re-afforestation on High and Low Lands; 5. Forest Pedological and Climatological Forestry; 6. Forest Preservation.

1936
- August 25-September 8: IX IUFRO Congress, Budapest and Sopron, Hungary
- The IUFRO Congress was organized in parallel with the II World Forestry Congress

1939
- September 1: World War Two began.
- IUFRO continued its work and communication by correspondence during the War, and in 1944, it undertook a multilateral larch provenance trial.

1940
- The IUFRO Congress and the III World Forestry Congress planned for Helsinki, Finland, were cancelled.

1948
- September 5-11: X IUFRO Congress, Zurich, Switzerland.
- IUFRO remained independent (President – E. Lönnroth) and refused to merge with the UN Organization – FAO.
- The second reorganization. New Statutes and governing bodies: the Congress, the International Council, the Permanent Council, the President, Vice-President.
- Changing one word in the IUFRO name from "Forestry" to "Forest" to attract a wider range of forest organizations.
- Establishment of 11 Research Sections. Another new unit was the Joint FAO/IUFRO Committee on Forest Bibliography and Terminology.

1949
- March 18: An Agreement for cooperation between IUFRO and the FAO was signed by the FAO (IUFRO signed it on November 11, 1948). FAO received the observer status at IUFRO.
- The IUFRO Secretariat was placed at the FAO HQ's (Geneva, later Rome)

1953
- September 22-26: XI IUFRO Congress, Rome, Italy.
- Introduction of the first IUFRO Award: IUFRO Honorary Membership. Its first recipients were the three former IUFRO Presidents: Philibert Guinier (France), Gyula Roth (Hungary) and Erik Lönnroth (Finland) for their great contributions to IUFRO's development. By 2015, 39 honourable persons received this award. In 1986, Ivan S. Melekhov (USSR) received this Award. The last, 39th awardee is former IUFRO President Lee Don Koo (Republic of Korea).

1956
- July 7-14: XII IUFRO Congress, Oxford, UK.
- IUFRO had grown to include 68 member-countries at the time.

1957
- The UN FAO's Forestry and Forest Industries Division asked to be released from its duties of the Secretariat for the Union. The request was satisfied. The IUFRO Secretariat was again at the office of the acting IUFRO President in charge.

1961
- September 10-16: XIII IUFRO Congress, Vienna, Austria
- The third reorganization: new Statutes and Internal Regulations were adopted; in addition to the Permanent Committee, the Union established the Enlarged Committee, consisting of the Permanent Committee Members and the leaders of the twelve research sections.

- The emblem (logo) of IUFRO, a globe surrounded with the initials, was used for the first time.

1967
- September 3-10: XIV IUFRO Congress, Munich, Germany
- A word «Forestry» instead of «Forest» was returned to the name of the Union – International Union of Forestry Research Organizations.

1969
- The second logo of IUFRO (the globe topped by a spruce tree, later called the "rocket") was used on the cover page of the IUFRO Congress and Annual Report for 1968, published in 1969.

1971
- March 14-20: XV IUFRO World Congress, Gainesville, USA
- The first IUFRO Congress, held outside of Europe; and it was for the first time that the Congress was called IUFRO World Congress.
- For the first time, the Congress used a motto/theme (in that case, it was: The Role of Research in the Intensification of Forestry Practices and Activities).
- The fourth reorganization of the Union: its new Statutes and Internal Regulations were approved at the XV World Congress, Gainesville. The goals of IUFRO were clarified and broadened; the Permanent Committee was replaced with an Executive Board consisting of regional representatives and technical program coordinators (Division Coordinators). They directly participated in major IUFRO activities; the Research Sections were replaced with Subject Groups and Project Groups, combined in 6 Divisions. The International Council had got its new operational procedures to conduct business and address major, high-level matters; it was decided to re-establish the Permanent Secretariat to take part of the burden from the President.
- The six Divisions were: 1. Forest Environment and Silviculture; 2.Forest Plants and Forest Protection; 3. Forest Operations and Techniques; 4. Planning, Economics, Growth and Yield, Management, and Policy; 5. Forest Products; 6. General Subjects.
- The second award is established: the IUFRO Scientific Achievement Award (SAA). Dr. D.A.N. Cromer (Australia), Member of the IUFRO Permanent Committee, designed and produced the medal and scroll for this award. The first five recipients were: Dr. D. Zachar (Czechoslovakia), Dr. Edwin Donaubauer (Austria), Mr. F.D. Podger (Australia), Mr. Donald M. Fuquay and Dr. Gene Namkoong (USA). By 2015, 86 scientists received the Award. In 1976, the award was granted to Dr. Alexander S. Isaev (USSR).
- IUFRO News (an information source for IUFRO members, officers and office-holders) was launched. The first issue was published in 1972 by President Ivar Samset (As, Norway).

1972
- The Internal Regulations were aligned with the new IUFRO Statutes, printed and disseminated to member organizations.

1973
- June 24: An Agreement was signed between IUFRO and the Austrian Government (Ministry of Agriculture and Forestry of the Republic of Austria) for the location of the IUFRO administration office (Secretariat) at the Federal Forestry Research Institute in Schönbrunn, Vienna, Austria. O.Bein was appointed IUFRO Secretary.

1976
- June 20 – July 2: XVI IUFRO World Congress, Oslo, Norway.
- For the IUFRO Secretariat, English was recommended as the main operational language and for use in correspondence.
- By mutual agreement, the FAO and IUFRO abolished the Joint FAO/IUFRO Committee on Forest Bibliography and Terminology in connection with the completion of the work at the Terminology of Forest Science, Technology, Practice, and Products Multilingual Guide (English version).
- A support program for young scientists, the prototype of IUFRO Special Programme for Developing Countries (SPDC) started to emerge. Supported by NORAD (the Norwegian Agency for Development Cooperation), 50 young scientists from 27 developing countries could participate in the IUFRO Congress in Oslo.

1978 - The third award was established: the IUFRO Distinguished Service Award (DSA) to honour outstanding officers of the Union.

1980 - IUFRO Certificate of Appreciation was introduced to acknowledge essential contributions in organizational matters and it was granted for the first time in 1981.

1981 - September 7-12: XVII IUFRO World Congress, Kyoto, Japan – It was the first IUFRO Congress, held in Asia.
- Election of the first IUFRO President from a socialistic country, Yugoslavia, - Prof. Dusan Mlinsek (Slovenia).
- The new IUFRO Distinguished Service Award was granted to Mitsuma Matsui (Japan). By 2015, 103 IUFRO officers received the IUFRO DSA. In 2004, Professor Nikolay A. Moiseev (Russian Federation) received this award.
- President Walter Liese handed out the new designed IUFRO flag to the representatives of the Congress Organizing Committee for the forthcoming Congress (Ljubljana Yugoslavia). A new IUFRO tradition was born.

1983 - The Special Programme for Developing Countries (SPDC) was established based at the IUFRO Secretariat. It became the first IUFRO Special Programme.

1986 - September 7-21: XVIII IUFRO World Congress, Ljubljana, Yugoslavia – the only Congress, held in a socialist country.

1987 - The first IUFRO Task Force (TF) Air Pollution - Forest Decline began its work.
- Heinrich Schmutzenhofer followed O.Bein as IUFRO Secretary.

1990 - August 5-11: XIX IUFRO World Congress, Montreal, Canada
- The fifth reorganization of IUFRO: Revision of the IUFRO Statutes and Internal Regulations.
- For the first time a representative of a developing country – Dr. Salleh Mohd. Nor. (Malaysia) was elected IUFRO President.
- For the first time, a lady was elected Member of the IUFRO Executive Board: Marcia J. Lambert from Australia as the representative of the West-Pacific Region.
- Spanish became the fourth official IUFRO language.
- The IUFRO World Series was launched, and Vol. 1 was published: Schmid-Haas, P. (ed.) 1990: Vocabulary of Forest Management. Vienna, IUFRO; Birmensdorf, WSL (6 languages).
- Austria recognized IUFRO at the legislative level which gave the Union certain advantages.

1992 - August 31 - September 4: IUFRO Centennial Meeting, Berlin and Eberswalde, Germany – IUFRO celebrated its 100 Anniversary at its birth place – Eberswalde.

1995 - February: IUFRO Initiative on Forest Terminology (Sylvavoc) became the second project at the IUFRO Secretariat (the first one was the SPDC).
- Another publication series was launched: Occasional Paper No.1 was published: Global Change and Terrestrial Ecosystems (GCTE Report No. 4). Canberra, GCTE; Vienna, IUFRO.
- Among other publications, IUFRO published brochures: A Guide to IUFRO and Honours and Awards. Further the Occasional Paper No.3 of the Planning a Conference Series was published.

1995 - August 6-12: XX IUFRO World Congress, Tampere, Finland
- Amendment to the Statutes: Special Committees, Programs and Projects were included.

1996 - Reorganization of Divisions 1 and 2 and creation of Divisions 7 and 8 in view of the increase in activities in their topics and complexity of the workload of their Division Coordinators. According to the Statutes, there were now eight IUFRO Divisions: 1. Silviculture; 2. Physiology and Genetics; 3. Forest Operations and Techniques; 4. Inventory, Growth, Yield, Quantitative and Management Sciences; 5. Forest Products; 6. Social, Economic, Information and Policy Sciences; 7. Forest Health; 8. Forest Environment.

- IUFRO Certificate of Appreciation, the fourth IUFRO (see 1980) award received a new content. In 1996-2013, 285 persons and organizations were awarded. In 2003, Dr. Victor K. Teplyakov and Alexander E. Droskov, and in 2009 – Professor Valentin S. Shalaev became its recipients. It was also received by different organizations and persons before 1996: in 1980, the USSR State Committee on Forestry (Minister G.I.Vorobyov), Caucasian Branch of VNIILM (Director V.S. Kholiavko), and VNIILM (Director N.A. Moiseev) received it in 1980, 1992 and 1994 for good preparation of the conferences under the auspice of IUFRO.

1997
- For the first time, a lady became an IUFRO Division Coordinator (D1) – Dr. Lisa Sennerby Forsse (Sweden) replaced Dr. Jacob L. Whitmore who became IUFRO Vice-President, responsible for Administration.

1998
- September 7-10 (Gmunden, Austria): Initiated by Austria and Indonesia, supported by FAO and CIFOR, the International Consultations on Research and Information Systems in Forestry (ICRIS) were prepared and organized by IUFRO. These consultations were held in response to the recommendations of the Intergovernmental Panel on Forests (IPF, later – IFF, and now – UNFF). The GFIS (Global Forest Information Service) was an outcome of that Conference.
- November 22-28, the first IUFRO Regional Congress in Latin America: Sustainable Management of Forest Resources - Challenge of XXI Century was held in Valdivia, Chile [Primer Congreso Latinoamericano IUFRO (IUFROLAT I): El Manejo Sustentable de los Recursos Forestales - Desafío del Siglo XXI]. Organized by José Antonio Prado and Santiago Barros, Chile.

1999
- With CABI-Publishing, IUFRO initiated a new Research Series. By 2005, 11 volumes were published. Vol.1: Forest Dynamics in Heavily Polluted Regions was Report No. 1 of the IUFRO Task Force on Environmental Change (J.L. Innes and J. Oleksyn, editors), 2000.

2000
- August 7-12: XXI IUFRO World Congress, Kuala Lumpur, Malaysia.
- The sixth reorganization of IUFRO: revision of the IUFRO Statutes and Internal Regulations.
- The word «Forest» instead of «Forestry» came back to the name of the Union.
- The fifth award IUFRO Outstanding Doctoral Research Award was established. By 2015, 31 recipients were listed so far.
- The sixth award IUFRO Best Poster Award was established. By 2015, 34 authors of excellent posters for Congresses had been awarded.
- For the second time, a woman was elected IUFRO Division Coordinator (D5) – Dr. Kathy Wang (China-Taipei, Taiwan).

2001
- January 30 – February 5: The IUFRO-WFSE (World Forests, Society and Environment) Strategy Workshop was held in CATIE, Turrialba, Costa Rica. Lunched as a IUFRO Special Project for 2002.
- April: the UN established the Collaborative Partnership on Forests (CPF). IUFRO is its member amongst 14 international organizations, institutions and secretariats with major forest programs.
- The IUFRO Board established a new Programme – the Global Forest Information Service (GFIS).
- The IUFRO Board launched a new Project: World Forest, Society and Environment (WFSE). The WFSE was initiated by the Finnish Forest Research Institute (Metla), the European Forest Institute (EFI) and United Nations University in Japan (UNU) in 1996.
- IUFRO Secretariat started to publish the bimonthly E-notes

2002
- In the January issue of IUFRO News, the third IUFRO logo and new layouts for IUFRO publications designed by the Canada Forest Service specialists were used for the first time. Artist Pavel Choma received IUFRO Certificate of Appreciation for his work at the logo.

- March 16: IUFRO signed the Memorandum of Understanding (MOU) with Korea Forest Research Institute (KFRI). Renewed on September 18, 2008.
- August 27-30: The first IUFRO European Regional Conference: Forestry Serving Urbanized Societies was held in collaboration with the European Forest Institute (EFI) in Copenhagen, Denmark.
- The first version of GFIS (Global Forest Information Service) was launched at the IUFRO European Regional Conference.
- IUFRO Secretariat moved back to the renovated historical building to Mariabrunn, Vienna, where IUFRO was initiated in 1890, at the first forest education and research center in the early 19th century.
- October 9: Symposium 110 years of IUFRO, Vienna-Mariabrunn, Austria
- IUFRO and International Forestry Students' Association (IFSA) signed the Memorandum of Understanding. IFSA received the observer status at IUFRO. The Board approved a Student Award.
- Terms of References for IUFRO Chapters (groups of members in one geographic region) were adopted.
- November: The first Memorandum of Understanding (MoU) with a Chapter was signed: the MOU with the Asia Pacific Association of Forestry Research Institutions (APAFRI, since 1995) and recognized it as its Asia Pacific Chapter.

2003
- September 22: at the XII World Forestry Congress (Quebec, Canada), IUFRO launched the World Forests, Society and Environment (WFSE) Publications, Executive Summary. WFSE published its newsletter.
- December: The Executive Secretary of IUFRO H. Schmutzenhofer retired and was followed by Peter Mayer.

2004
- March: the Executive Director of APAFRI became the IUFRO-SPDC Regional Coordinator.
- October: IUFRO signed the Memorandum of Understanding (MOU) with the Northeast Asian Forest Forum (NEAFF) and formally recognized NEAFF as its Northeast Asia Chapter.
- December: Initiation of the IUFRO Scientific Summary for important issues. Published electronically in IUFRO News – IUFRO Scientific Summary No.1. The Facets of Continuous Cover Forestry. By Arne Pommerening, C4.04.01 Scenarios for Transformation Forest Management. In January 2015 – No.128. The print version of IUFRO News was terminated, and the electronic version continued.
- Web-site restructuring: more user-friendly, reflecting benefits of IUFRO membership via introduction of Member Zone and non-Member Zone.

2005
- August 8-13: XXII IUFRO World Congress, Brisbane, Australia – the fourth continent where IUFRO held its Congress.
- Gender balance in the IUFRO senior management significantly improved: three ladies were elected Members of the IUFRO Board: D4 Coordinator Dr. Margarida Tome (Portugal), D5 Coordinator Dr. Kathy Wang (China-Taipei, Taiwan), and Dr. Su See Lee (Malaysia) as a Member of Board.
- The seventh award IUFRO Student Award for Excellence in Forest Sciences was granted for the first time at the Congress. By 2015, there were 11 recipients.
- The eighth award IUFRO World Congress Host Scientific Award was granted for the first time at the Congress. By 2015, six persons were awarded.
- IUFRO became a full member of the International Council for Science, former ICSU – International Council of Scientific Unions.
- IUFRO signed the Memorandum of Understanding (MoU) with International Union for Conservation of Nature (IUCN) and MoU with the World Wide Fund for Nature (WWF) as well as with the Tropical Agricultural Research and Higher Education Centre (CATIE). IUCN, WWF and CATIE have the observer status at IUFRO.

- IUFRO News (printed) and E-notes (electronic) were merged into the electronic IUFRO News.

2006
- October 23-27, the second IUFRO Latin American Congress: Forests - The Growing Importance of Environmental, Social and Economic Functions was held in La Serena, Chile [Segundo Congreso Latinoamericano IUFRO (IUFROLAT II): Bosques – La creciente importancia de sus funciones ambientales, sociales y económicas]. Organized by Santiago Barros.
- The first Keep Asia Green (KAG) project was launched. Published as IUFRO World Series Volumes 20-I, 20-II, 20- III, 20-IV and KAG Forest Restoration Across Boundaries

2007
- April: The Global Forest Expert Panels (GFEP), launched at the initiative of the Collaborative Partnership on Forests.
- September 6-8: the first IUFRO European Congress 2007: Forests and Forestry in the Context of Rural Development was organized in conjunction with the EFI Annual Conference 2007 in Warsaw, Poland.
- September 29: IUFRO signed the Memorandum of Understanding (MoU) with International Tropical Timber organization (ITTO).

2009
- October 18-23: At the World Forestry Congress, IUFRO and FAO recalled the 60 years of successful collaboration between the two organizations and re-signed the MoU to foster their very productive collaboration in the future.

2010
- August 23-28: XXIII IUFRO World Congress, Seoul, Republic of Korea
- For the first time in IUFRO history, a welcome address to the World Congress was made by the highest representative of the host country – President Lee Myung-bak (Republic of Korea).
- For the first time, keynote speakers included a Nobel Prize Winner (Processor Elinor Ostrom, USA, Nobel Memorial Prize in Economic Sciences, 2009), and a nominee to the Nobel Prize (poet Ko Un, Republic of Korea).
- For the first time, IUFRO adopted its Strategy for 5 years (2010-2015).
- A new Division was established: Division 9 Forest, Policy and Economics (Coordinator: Daniela Kleinschmit, Germany/Sweden).
- Dr. Su See Lee (Malaysia) became the first woman elected IUFRO Vice-President.
- The Executive Director of IUFRO, Peter Mayer resigned and was followed by Alexander Buck.

2011
- International Year of Forests. IUFRO prepared its publication: Embracing complexity: Meeting the challenges of international forest governance. It was published in 2011 and formally presented at the 9th Session of the UNFF on January 24 – February 4, 2011, at the UN Headquarters in New York City.
- November 22: IUFRO launched its IUFRO Spotlight communication initiative.

2012
- June 25-30: the first IUFRO-FORNESSA* Regional Congress in Africa: Forests and Trees Serving the People of Africa and the World was jointly hosted by the International Centre for Research in Agroforestry (ICRAF) and the Kenya Forestry Research Institute (KEFRI) in Nairobi, Kenya. [* FORNESSA: The Forestry Research Network for Sub-Saharan Africa]

2013
- June 12-15: the third IUFRO Latin American Congress: Forests, Competitiveness and Sustainable Landscapes [IUFROLAT 2013 Tercer Congreso Latinoamericano de IUFRO: Bosques, competividad y territorios sostenibles], San José, Costa Rica.

2014
- October 5-11: XXIV IUFRO World Congress, Salt Lake City, USA
- For the first time, a scientist from Africa was elected IUFRO President – Dr. Michael Wingfield (South Africa).
- A new format of students' involvement in the IUFRO scientific program was used: The IUFRO Incubator 2014.

- October 9: IUFRO and Finnish Forest Research Institute (METLA) signed the Memorandum of Understanding.
- The XXIV World Congress had wide coverage in social networks, blogs, Twitter, Facebook, YouTube and others.

2015
- September 4: IUFRO organized a Research Symposium: Underpinning sustainable tree plantations in Southern Africa – a Pre Congress event at the XIV World Forestry Congress (Durban, South Africa).
- September 7-9: IUFRO Divisions and Task Forces organized a number of side events at the XIV World Forestry Congress (Durban, South Africa).

2016
- October 24-27: IUFRO Regional Congress for Asia and Oceania Forests for Sustainable Development: The Role of Research was held in Beijing, China.
- Dr. Su See Lee, Malaysia became the first woman received the oldest and the highest IUFRO Honorary Membership award. She became the 40th person in the List of awardees.

2017
- September 18-22: IUFRO 125th Anniversary Congress: Interconnecting Forests, Science and People. Freiburg, Germany.

2019
- For the first time, a IUFRO World Congress will take place in Latin America – in Curitiba, Brazil.

By Victor K. Teplyakov (first published in: Teplyakov, V.K. and Shalaev, V.S. 2014. A History of IUFRO Congresses and Russia. Moscow, Russia. Volume 2, Annex 1, in Russian).

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2. Russian participation in IUFRO Congresses[323]

No.	Year	Place	No.	Participants
	1892	Eberswalde		Did not participate
I	1893	Vienna		Did not participate
II	1896	Braunschweig	1	V.A. Tikhonov.
III	1900	Zurich and Bern	2	G.F. Morozov, A.G. Marchenko.
IV	1903	Vienna	1	G.F. Morozov.
V	1906	Stuttgart and Ravensburg	2	G.F. Morozov, P.Z. Vinogradov-Nikitin
VI	1910	Spa and Brussels	2	G.F. Morozov, V.G. Schönberg.
VII	1929	Stockholm	14	A. Guba, L. Ivanov, B. Ivashkevich, N.Kobranov, A. Kolesnikov, S. Melnik, P.S.Pogrebnyak, S.S. Prozorov, V. Shkatelov, N.N. Stepanov, V.N. Sukachev, A.V. Tyurin, M.E. Tkachenko, A.A. Yunitskiy
VIII	1932	Nancy		Did not participate
IX	1936	Budapest		Did not participate
X	1948	Zurich		Did not participate
XI	1953	Rome		Did not participate
XII	1956	Oxford	1	V.N.Sukachev.
XIII	1961	Vienna	9	N.P. Anuchin, P.V. Vasilyev, N.A.Lazarev, I.S. Melekhov, I.M. Naumenko, I.V. Tropin, V.G. Chertovskoy, A. Shvakin, A.A. Tsymek
XIV	1967	Munich	3	P.V. Vasilyev, I.S. Melekhov, E.S. Pavlovskiy
XV	1971	Gaineswille	3	I.S.Melekhov, N.A.Moiseev, N.G. Kolomiets
XVI	1976	Oslo	12	N.A. Moiseev, V.G. Atrokhin, I.K. Ievin, L.N. Mikhailov, S.E.Vomperskiy, A.S. Isaev, Y.D. Khilov, A.B. Gukasyan, A.I. Utkin, L.A.Kairyukshtis, V.V. Protopopov, N.I.Pyavchenko, V.Voronitsin. – 9 papers.
XVII	1981	Kyoto	6	G.I.Vorobyov, C.E.Vomperskiy, I.K.Ievin, A.I.Isaev, N.N.Larionova, N.A.Moiseev – 11 papers presented (one at a plenary session).
XVIII	1986	Ljubljana	23	38 papers presented
XIX	1990	Montreal	15	45 papers presented
XX	1995	Tampere	44	66 papers presented (including 35 posters)
XXI	2000	Kuala Lumpur	43	47 papers presented (including 28 posters)
XXII	2005	Brisbane	7	21 papers presented (including one at sub-plenary session)
XXIII	2010	Seoul	20	22 papers presented
XIV	2014	Salt Lake City	9	20 papers presented (one from a student)

[323] The names are given according to modern transliteration.

3. Russian representatives in IUFRO's senior leadership

Year	Name – Position
1903-1910	Morozov G.F.– Leader, delegation from the Russian Empire
1929-1932	Kobranov N.P. – Member, International Council; Bibliographical Commission; Tyurin A.V. – Vice-Chair, Forest Ecology Section
1932	Vilenskiy D.G. – Member, Committee on Podsolic Soils
1956-1961	Sukachev V.N. – Member, Permanent Committee and International Council
1962-1967	Anuchin N.P. – Member, Permanent Committee
1962-1976	Melekhov I.S. – Member, International Council (USSR)
1968-1976	Melekhov I.S. – Member, Executive Board (Eastern Europe)
1977-1985	Moiseev N.A. – Member, Executive Board and International Council (USSR)
1986-1990	Ievin I.K. – Member, Executive Board Moiseev N.A. – Member, International Council (USSR)
1991-1995	Petrov A.P. – Member, Executive Board Moiseev N.A. –Member, International Council (USSR/Russia) Alekseev V.A. – Alternate, International Council Chuenkov V.S. – Division 4 Deputy Coordinator
1996-2000	Strakhov V.V. – Member of the Executive Board (Russia) Teplyakov V.K. – Division 4 Deputy Coordinator; Member, International Council Filipchuk A.N. – Alternate, International Council
2001-2010	Teplyakov V.K. – Board Member
2001-2005	Vaganov E.A. – Member, International Council
2006-2019	Shalaev V.S. – Member, International Council Filipchuk A.N. – Alternate, International Council (2007)
2010-2014	Kulikova E.G. – Board Member
2014-2019	see the IUFRO Homepage: http://www.iufro.org/

About the authors

TEPLYAKOV, Victor K. graduated from the Moscow Forest Engineering Institute in 1977. He is a Ph.D. holder in Forest Management and Planning. He worked at the Moscow Forest Engineering Institute, later renamed into the Moscow State Forest University, from 1977 until 2009, during the same period, serving as the Director of the Research, the Russian Federal Forest Service (1993-1999), the Head of the Global Temperate and Boreal Forest Programme at IUCN (1999-2009), and a Professor of Seoul National University (2009-2016). Dr. Teplyakov is the author and co-author of over 250 articles, chapters, and books. His most recent co-authored books are *Sustainable Forest Management* (2009, 2nd ed. 2014, in Russian), *North Korea Reforestation: International regime and domestic opportunities* (2012), *Berkshire Encyclopedia of Sustainability* (Vol. 5 and 9, 2012), *Sustainable Forests* in 4 volumes (2013), 산림과학개론 / Introduction to Forest Science (2014, in Korean), *A History of IUFRO Congresses and Russia* (2014, 2nd ed. 2015, in Russian), *Forest and Forestry* (2016, in Russian). He is also the author of *How to do research, write a paper and communicate the results: Guidelines for students and researchers* (2013).

SHALAEV, Valentin S. graduated from the Moscow Forest Engineering Institute; he is a Doctor of Technical Sciences, Professor. He has been working at the Moscow Forest Engineering Institute, later renamed into the Moscow State Forest University, since 1969. He is the Director of the Institute for Forest System Research. He is the author and co-author of over 350 scientific and methodical publications, including more than 50 patents for inventions. More than 40 scientific papers were published in international journals. His most recent co-authored books in Russian are *Biological productivity and carbon budget of larch forests of Northern-East Russia* (2008), *Technology of Sawmilling and Woodworking Industries* (2009, 4th ed.), *Scanning Electron Microscopy* (2010), *Foundations of Synergetic and Fractal Theory: an Introductory Course for Soil Science* (2011), *Soils in the Biosphere and Human Life* (2012), *Technology of sawmilling and woodworking industries. Concepts, terminology and definitions* (2013), *Lectures on the Theory of Inventive Problem Solving* (2013, 2014, 2016), *A History of IUFRO Congresses and Russia* (2014, 2nd ed. 2015), *Inventive problems with solutions for ARIZ-71 and ARIZ-77* (2016), *Research work. Lecture notes* (2016).