

## FOREWORD

History is important – not only to understanding the past, but to guiding the future. Dr. Alexe Alexe completed a monumental task by compiling an eight-volume set on **Worldwide Forest Mensuration History**. The material is presented by country in order to highlight the contribution of each country to the development of forest mensuration.

The chapters begin with a description of the land area, round wood production, main species, forestry education and research organizations, and primary forestry and related journals in the subject country. Where sufficient information exists, this introductory material is followed by a review of important contributions made to the topic areas of (1) tree volume, taper, and form, (2) tree growth, (3) site evaluation, (4) stand structure, (5) growth and yield prediction, (6) weight and biomass, (7) tree-ring studies, and (8) forest inventory. A chronology of selected noteworthy events is given, as well as a list of selected contributors (by time period and topic), and each chapter is concluded with additional comments by the author. The complete work contains information from 93 countries and is based on over 10,000 bibliographical references. The focus is on literature of the 19<sup>th</sup> and 20<sup>th</sup> centuries (the most recent citations included--except for a few cases -- are for 1999), but in instances where significant work on forest mensuration was published prior to the 19<sup>th</sup> century (e.g., in Germany and France), reference is made to that literature. It varies from volume to volume, but typically around 40 percent of the citations are for literature published in 1980 or later. Criteria used for selecting what literature to cite included: originality (at the time when the work was completed), methodological features, frequency of citation in the primary literature, and publication in main-line journals. Special attention was also given to listing books on forest mensuration and on review articles and bibliographies.

In preparing a history of forest mensuration, the author had three primary purposes. First, was to organize the material at the country level in order to provide a better understanding of the development of this discipline in given geographical areas and within an overall historical framework. Second, was to supply a reasonably comprehensive base of information about important aspects of forest mensuration. And third, was to enable those desiring information on the roots of forest mensuration to locate key literature in the shortest possible time. This bibliographical material fulfills many informational needs, including iden-

tifying key contributions and important milestones in forest mensuration.

Although the past is unchanging, it can be interpreted in different ways. Subjectivity is inherent in any account of history. Dr. Alexe did an admirable job of seeking out the most important contributions to forest mensuration in each country and organizing the material chronologically and by topic area. **Worldwide Forest Mensuration History** is a treasure trove that can aid students, instructors, researchers, and practitioners in gaining a perspective on the development of forest mensuration around the world and in finding key information quickly and efficiently. Forestry professionals worldwide, especially those specializing in, and devoted to the measurement of trees and forests, are indebted to Dr. Alexe for his Herculean effort to compile a comprehensive global history of forest mensuration.

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## PREFACE

This is the first volume of “Worldwide Forest Mensuration History” and refers to “Forest Mensuration History of Nordic and North-Western European Countries”: Finland, Norway, Sweden, Belgium, Denmark, Ireland, Netherlands and United Kingdom.

We adopted the concept of forest mensuration “*in sensu lato*” by including in this discipline all its main four branches: (1) timber mensuration (including biomass studies), (2) evaluation of forest site productivity (which has strong connections with ecology and soil science), (3) tree-ring studies (or dendrochronology “*in sensu lato*” containing dendrochronology “*in sensu stricto*”, dendroclimatology and dendroecology), and (4) forest inventory including sampling, remote sensing and GIS techniques.

The text is organized on country level and depending on the availability of information, mentioned papers or events are grouped as follows: (1) tree, (2) site evaluation, (3) stand structure, (4) stand growth and yield, (5) weight and biomass studies, (6) tree ring studies, (7) forest inventory. In the countries with reasonably reviewed works the text is supplied with: a) a chronology of selected works or events, b) a list of selected contributors, and c) comments. In all cases presentation of works or events is given in chronological order. The text for every country contains “General information” which refers on the total land area, forest area, vegetation (species and forest types), volume and biomass per hectare, round wood production, teaching and research institutions involved in forest mensuration, leading journals and periodicals, and general literature with forestry or historical information - if available.

In all countries the methodological aspects were underlined, especially modelling of growth and yield, bio-mathematical oriented models, sampling methods, remote sensing and GIS techniques.

In our opinion a history of forest mensuration on country level offers a better understanding of the development of this discipline in a given geographical and historical frame. On the other hand, the knowledge of the forest mensuration history in a large number of countries represent a valuable premise for elaboration of different syntheses on regional or global level by topics. This was the first purpose of our book. The second purpose was to supply the reader with a reasonable data base of information. In the first volume 1046 references have been included out of which 38 % refer to papers published after 1980 and 16 % to that published between 1991 and 1999.

Many works published before 1980 contain information which are still valid today and have been “rediscovered” later and presented as new ideas because the original text was ignored or forgotten. The early literature has its high historical importance and helps to the understanding of the evolution of a specific subject.

As criteria for the selection of cited paper we used: originality (at the time when the considered work was completed), methodological features, originality or/and uniqueness of the case studies, frequency of citations in the core monographs, forest mensuration books, and articles published in main-line journals and serials in forestry and adjacent disciplines.

The most difficult problem was the selection of cited papers in our book. Any selection is strongly correlated with the problem of the sample representativity.

We discussed this problem with many specialists in forestry, statistics and history. The general opinion was that in any book of history there is a doubt and the risk of subjectivity which cannot be avoided in totality. This is the reason why we hesitated a long time to prepare our texts for publication. We are not sure that we succeeded to perform the huge task to present the facts in a proper manner, at least acceptable as a first valid version.

We are aware that our available bibliographical material could be presented in other different versions. It is said that the past is unchanging and the future is open to many directions (at least sometimes) but the past could be interpreted in different ways and this is why we consider that the history is more than the knowledge of the past, it is a background for forecasting different possible alternatives and scenarios.

We would like that this book on the history of forest mensuration to be considered above all as an act of culture because it is dedicated to all people interested in the preservation of forests and whose profession is connected in a way with forestry.

**Alexe Alexe**

Bucharest, May 25, 2003

## TECHNICAL NOTE

There are different opinions on the content of timber mensuration.

In this book the term "forest mensuration" when used it is considered "*in sensu lato*" including the following branches which are accepted by many authors as independent disciplines of forestry: (1) timber mensuration including tree and stand, weight and biomass measurement; (2) evaluation of forest site productivity by different methods including site index systems; (3) tree-ring studies (dendrochronology in sensu lato: tree-ring chronologies, dendroclimatology, dendrohidrology, dendroecology); (4) forest inventory and assessment of woody and non woody forest resources conducted on large areas (forest, region, country) and associated as a rule with remote sensing and GIS techniques.

The history is presented for each country separately. In this respect the principle of "land priority" was applied, in the sense that all references on a given country are included in the text for this country regardless of the nationality of the author(s). The papers which refer to more than one country are mentioned in all the involved countries. If the nationality of the author(s) is unknown, the paper was included under the headline of the country in which it has been published.

The definition of terms as forest land, other wooded land and biomass are adapted according to that specified in FAO forestry paper 124/1995: "Forest resources assessment 1990" pp. 41 and 42 as follows:

**Forest land:** "with tree crown cover (stand density) of more than about 20% of the area. Continuous forests with trees usually growing more than about 7 m in height and able to produce wood. This included both closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground and open forest formations with a continuous grass layer in which tree synusia cover at least 10% of the ground." (p. 41).

**Other wooded lands:** "Land which has some forestry characteristics but is not forest as defined above. It includes: open woodland and scrub, shrub and brushland (see below), whether or not used for pasture or range. It excludes land occupied by "Trees outside the forest" (see below), (p. 41).

**Scrub, shrub and bushland:** "Land with scrub, shrub or stunted trees where the main woody elements are shrubs (usually more than 50 cm and less than 7 m in height), covering more than about 20 % of the area, not primarily

used for agricultural or other non-forestry purposes, such as grazing of domestic animals. Trees outside the forest are excluded" (p. 42). Scrub is a land covered with trees and bushes of poor quality.

**Biomass** is the oven-dry weight of all species of trees to a minimum dbh of 10 cm, above ground only, and includes main stems, branches, twigs, leaves and fruits.

Biomass was determined according to a model detailed in the above-mentioned FAO work.

For site and forest site productivity the following definitions have been adopted (unless otherwise specified) after European Forest Institute, Research Report No. 5, 1966, p. 2:

"The term **site** is used to describe the sum of environmental conditions (biotic, edaphic, topographic and climatic conditions, including atmospheric composition) in existence at a particular location".

"**Forest site productivity** is defined as the woody biomass production potential of a site. In this project the term site productivity is limited to the wood production potential of a site for a particular tree species, provenance or forest type. For example, growth of volume, basal area or height may serve as an indicator of site productivity" (From the Introduction of EFI Research Report No. 5/1996 written by Heinrich Spiecker).