

THE FINNISH FOREST RESEARCH
INSTITUTE

Helsinki 1976

THE FINNISH FOREST RESEARCH INSTITUTE IN 1976

Why investigate forests ?

The Finnish Forest Research Institute has been doing its work for more than 50 years. As result of its efforts and those of some other organizations, much valuable information on Finnish forests and forest resources has been acquired. The Finnish Forest Research Institute faces, in the 70's, a new field of problems. The intensive stage of Finnish forestry, started in the 1960's, continues. The development can be described by following consumption numbers of industrial raw wood (excl. waste wood)

Year	
1938	18.2 mill. m ³
1950	17.5 "
1970	38.3 "

The increased need for raw wood has now to be satisfied by a forest area, which is 12 per cent smaller than in the 1930's. We have to take more wood out of our forests without jeopardizing our harvesting possibilities even in the following century. This is the great challenge to Finnish forest research of today.

The practical intensification of forestry is realized primarily by increasing forest improvement activities: forest cultivation, ditching and fertilization. If the output of forests is to be increased, the method must be understood in every detail. The intensive forestry requires more effective research work in the traditional research fields, such as soil science, peatland forestry, silviculture, forest economy, forest inventories, growth and yield and the rationalization of forest work.

Intensive forestry has, however, created new problems. In order to study them, research into forestry has had to pioneer new research fields. Forest protection and forest tree breeding are two of these.

Finland is facing a shortage of wood, and the scarce raw material at our disposal must be utilized carefully. The possibilities to use small-sized wood, branches, stumps and needles must be studied. Mechanized harvesting has proved to be a topic for research.

Concern for the forest-machine operators has led to ergonomic studies in order to improve the working conditions of forestry workers.

Besides wood production, forests, today, have several other functions as well. The demands for the multiple use for forests have been noticed at the Finnish Forest Research Institute. Investigations into the recreative value of forest have recently been started.

The problems of forestry are difficult, variable and recurrent. It is the task of research to find solutions to them. Research is the way to a more productive, a healthier and a better forest. This forest also provides a better environment for a man.

DUTIES

The Finnish Forest Research Institute is the principal forestry research organization in Finland, subordinated to the Ministry of Agriculture and Forestry. Its duties are described by a statute according to which the Institute is to

- carry out investigations and experiments in order to improve forestry in Finland
- to publish the results of its work and to present important topical findings in a popular form

- to participate in international cooperation in forest science
- to provide research opportunities especially for young research officers
- to provide information and recommendation, when requested by the Government
- to be responsible for the experimental forests and certain nature conservation areas, and
- to carry out other assignments from the Ministry of Agriculture and Forestry.

HISTORY

The Finnish Forest Research Institute was established in 1917. Initially it was supervised by the National Board of Forestry, but in 1930 it was placed directly under the Ministry of Agriculture and Forestry.

Since 1939 the centre of the Institute has been Metsätalo (Forest House), which is located in central Helsinki. The same building also houses the forestry half of the Faculty of Agriculture and Forestry of Helsinki University.

At its founding, the Institute consisted of three small departments: silviculture, mensuration and inventory and soil science. Since then, however, research activities have expanded so that at present there are nine research departments and 14 professors in the Institute.

ADMINISTRATION

The expansion to nine departments coupled with increased activity in each of them led in 1962 to the creation of a directorship. Since 1964 the position of Director has been filled by Professor Viljo Holopainen.

Two additional offices handle practical matters connected with the research activities.

The Administrative Office deals with accounting and general administration. The Experimental Forest Office, supervised by Chief Forest Officer, administrates those state forest lands which are placed under the control of the Institute.

The highest decision making body is the Council of the Institute. It consists of the Director as president and all the professors as full members. The council is responsible for supervising activities of the Institute, reviewing the departmental research programmes, approving publications and providing a forum for discussing ideas and resolving problems. In recent years the Board has held approximately 30 sessions a year.

In 1953 a Negotiating Board was set up to facilitate communication and the flow of ideas between the Institute and those working in practical forestry. This body has ten members: the Director and one department head as representatives of the Institute and eight members appointed by the Ministry of Agriculture and Forestry to represent among others Helsinki University, the Central Forestry Associations (private forestry), the Agricultural Research Centre, the National Board of Forestry (state forest service) and the forest industry. The Board is to have at least two obligatory sessions yearly, but in recent years its role seems to have become more active.

STAFF

At the end of 1975 the Finnish Forest Research Institute employed approximately 490 persons. The number of research officers amounts to 140.

Each research department is headed by a professor. In some departments there are two professors, between whom the research field is divided. The rest of research staff consists of research specialists (comparable with assistant professors in universities) and research officres. They are assisted by the forest technicians, lab assistants, secretaries, etc.

RESEARCH ACTIVITY

The actual research work is carried out in the research departments and on four research and four experiment stations.

In order to present a more detailed picture of the actual activities of the Institute and its departments, the following brief descriptions of the departmental research work have been prepared.

THE DEPARTMENT OF SOIL SCIENCE

was established in 1917 and is headed by Professor P.J. Viro. The research objects consist of mineral soils and their use in forestry. Thus the Department is investigating the physical, chemical and microbiological properties of mineral soils and their effects on fertility as well as is conducting investigations into the development of soils and into various methods of soil amelioration.

In recent years particular attention has been given to the improvement of soil fertility by means of fertilization, prescribed burning of promotion of humus decomposition. At the same time the nutritional balance of soil has been studied and methods of determining its nutritional status developed.

THE DEPARTMENT OF PEATLAND FORESTRY

was established in 1928 and is headed by Professor Olavi Huikari. The department studies measures for forest improvement on four main lines. In basic researches, the main emphasis is given to special ecological experimental fields, where the significance of hydrology, biology, nutritive status and other growth factors of different peatlands are studied in various climatological conditions.

In studies concerning ditching, soil preparation and peatland fertilization investigations into the possibilities and profitability of using different kind of fertilizers on peatlands are made.

THE DEPARTMENT OF SILVICULTURE

The department of silviculture is one of the three original departments established in 1917 and is under the supervision of Professor Gustaf Sirén. The department investigates natural forest regeneration and its components, and forest tree seed crop to facilitate an effective seed service in Finland. Artificial regeneration and afforestation are studied to their full extent. In southern Finland the work is concentrated on Suonenjoki Experimental Station for Forest Regeneration and in northern parts of the country on Rovaniemi Research Station. The research work is done as team work together with research officers from the Departments of Forest Protection, Peatland Forestry, Forest Technology and Economy. Forest growth is studied in cooperation with specialists in forest yield studies.

THE DEPARTMENT OF FOREST GENETICS

The department, established in 1968 and headed by Professor Max. Hagman, carries out studies on the genetic structure of forest trees, applying the results obtained to tree breeding and regeneration. The goal is to increase timber production in collaboration with researchers involved in improving ecological conditions and silvicultural methods. An attempt is

also made to find genetically well-adapted varieties for each different locality and site, particularly for the severe conditions of Lapland. The Department works in close cooperation with the other forestry organizations that take part in forest tree breeding. It is also responsible for the scientific planning and control of the research activity within its field. In addition, a national central register of all tree breeding material is kept by the department.

THE DEPARTMENT OF FOREST PROTECTION

was established in 1972 by uniting previous departments of forest zoology and forest biology. The work done in the department still has a dual character.

In forest zoology (Professor Paavo Juutinen) the biology and occurrence of animals, harmful to forests, are studied as well as the damage caused by them. Observations and prognosis are made on large-scale damages, particularly fluctuations of insects injurious to needlers. The most important research topics concern the influence of fertilization on the occurrence of injurious insects, damage caused by them on seed orchards and animal damage on afforestation areas in North Finland. The biology of and damage caused by pine sawflies and voles are studied. Protective means applicable against them are also developed.

In the departmental section of forest pathology (Professor Tauno Kallio) the same aspects concerning injurious fungi, bacteria and virus are studied. The most important objects have been propagation mechanisms of wood rot (*Fomes annosus*) and pine twisting rust (*Melampsora pinitorqua*) and damage caused by fungi in nurseries. In addition, fertilization as protective means against some needle cast diseases has been studied.

THE DEPARTMENT OF FOREST TECHNOLOGY

established in 1931 conducts investigations on five main lines. The first three of them are under supervision of Professor Veijo Heiskanen. Studies into the structure and properties of wood are aimed at explaining the technical properties of domestic and important exotic tree species. The quality of plantation grown trees is compared with that of naturally regenerated trees. The influence of silvicultural measures on wood properties is studied as well.

The second line, wood as raw material for industry, consists of investigations into utilization of logging residues, into the influences of injuries, particularly in sawmill industry, into the limit between sawlogs and pulpwood as well as into the by-products of sawmill industry.

Measurement studies are made in order to develop measuring methods related to the rationalization of harvesting. Conversion coefficients are prepared in accordance with the law concerning timber scaling.

The final two lines are supervised by the professor of forest work science (Professor Pentti Hakkila). Mechanization of thinning work and technical aspects involved in harvesting logging residues are the main topics of studies aimed at rationalization of logging. The department is in charge of a joint Nordic project concerning the use of stumps, branches and roots.

Studies on the efficiency of silvicultural work focus on the development at nursery techniques and planting machines. In all forest work studies attention is paid to ergonomic aspects. The training of forest workers in different harvesting methods as well as in planting work is studied. The results obtained are further applied into studies on principles concerning wages in forestry.

THE DEPARTMENT OF FOREST INVENTORY

belongs to the original three departments established in 1917. On the area of inventory studies (Professor Kullervo Kuusela) the department investigates the methods of forest surveying, carries out continuous forest-inventory studies and investigates forest resources and their distribution with respect to the forest economy. In addition, forest-balance investigations are conducted in collaboration with the Department of Forest Economics.

The most important long-term work being carried out consists of the national forest inventories. Among other investigations in progress are: developing a two-stage sampling method for forest surveying using aerial photos and field excursions; improving the methods of calculating the volume of standing trees; and determining volume calculations for standing trees subject to the timber-measurement law.

In the field growth and yield research (Professor Yrjö Vuokila) investigations are carried out into the structure of stands, growth and yield and their improvement, the effect of mechanized thinning operations on the possibilities of wood production. Studies are carried out on both permanent and temporary experimental plots. The materials acquired in the national forest inventories are also used by this section of the department.

THE DEPARTMENT OF FOREST ECONOMICS

The department, which was established in 1928 has two main lines and nine minor groups within them. Professor Lauri Heikinheimo is responsible for the groups A - E.

A. Forest balances include the compilation of annual statistics on wood consumption and removal, their comparisons with planned allowable cut as well as national and regional forestry and forest industry prognoses and programmes. The related methodology is developed.

B. Forestry and forest industry in the national economy. Forestry and forest industry are investigated as an integrated subsystem of the national economy, specially accentuated the influences of the outputs of forestry on the whole society.

C. Labour force of forestry and forest industry. The standard of living, working conditions and wages of labour are studied and prognosis are made on the development on demand, supply and educational needs of labour.

D. Structure of forest ownership and the behaviour of forest owners. The behaviour of private forest owners and its regional and other differences is observed, prognosis are made on its structural changes.

E. Multiple use of forests. Alternative ways to use forests are compared with each other and the relations between wood production, recreation and reindeer husbandry etc. are studied.

Professor Jouko Hämäläinen is responsible for the groups F - I.

F. Wood regeneration. The theme is studied from business economical point of view with respect to such aspects as growing, thinning, regeneration, fertilization economics and organization of the economic unit.

G. Forestry and forest industry enterprice. The studies include the actual business activities as accounting and budgeting and terminological clarification of the business result.

H. Demand, supply and price of raw wood. The task is to explain, describe and prejudge factors influencing domestic raw wood markets.

I. Marketing of forest industry products. The production, distribution and consumption of forest industry products or their substitutes are studied both under domestic and foreign conditions.

THE DEPARTMENT OF MATHEMATICS

was established in 1967 and is at the moment headed by Act. Professor Risto Seppälä. The department develops and investigates statistical methods, required by forest research, cooperates with researchers in applying mathematical and statistical methods and educates them for these questions. The researchers of the department participate in applied research in forestry. The department also supervises and develops data processing for the Institute, publishes Annual Yearbook of Forest Statistics and prepares yearly a proposition for forest taxation.

RESEARCH AND EXPERIMENT STATIONS

Forest Research Stations were established primarily for the investigations of certain regional problems, especially those of northern Finland. Each station has an Advisory Council of its own and a permanent research staff concentrating mainly on problems relevant to the region in question. Research stations are headed by permanent researchers with academic title and are administratively subordinate to the Director of the Institute

Parkano Forest Research Station (1961, Dr. Olavi Laiho) investigates hydrological and ecological problems related to peatland forestry as well as forest regeneration on peatlands. Studies are made on silviculture (artificial regeneration), minor attention is paid to forest protection and soil science. Actual research work takes place in Parkano Experimental Forests and on the Alkkia Field Station.

Kolari Forest Research Station (1964, Lic. Erkki Numminen) has concentrated on forest tree breeding as applied to the local conditions in Lapland. Ecological and hydrological peatland forestry also are topics of the research programme. Many field operations take place at Teuravuoma Field Station.

Pyhäkoski Forest Research Station (1969, Mr. Jukka Valtanen) performs research in silviculture, peatland forestry, forest entomology and forest yield.

Rovaniemi Forest Research Station (1970, Dr. Erkki Lähde) investigates problems of silviculture, forest pathology, multiple-use of forests, growth and yield and soil science.

Whereas the research stations function on a regional basis, the experiment stations solely concentrate on specific and restricted questions. Work at the experiment stations is conducted by researchers from Helsinki, the stations being supervised by a research department of the Institute.

Suonenjoki Experiment Station for Forest Regeneration is devoted to nursery and afforestation studies. Unlike other experiment stations, there are permanent research officers at the station, a silviculturist, a pathologist and an ergonomist. The station is effectively used by the larger forest regeneration research team.

Punkaharju and Ruotsinkylä Tree Breeding Stations are subordinate to the Department of Forest Genetics.

Ojajoki Experiment Station, the newest one, is totally devoted to the vole studies of the Department of Forest Protection.

EXPERIMENTAL FORESTS

The Institute has a comprehensive network of experimental forests which represent nearly all parts of Finland (see the enclosed map).

The task of the Experimental Forest Office is to maintain and develop forests and other areas controlled by the Forest Research Institute so that they well serve the purpose of research and fulfill the needs of nature conservation. The Office must also plan and carry out assistance on research projects.

Administratively, there are 17 experimental forests. The total area of these forests, the greatest part of which is located in northern Finland, is approximately 77 000 hectares.

In addition to the experimental forests, researchers may make use of Institute controlled nature conservation areas, the total area of which is approximately 62 000 hectares. Furthermore, the National Board of Forestry and some forest industry companies have made agreements concerning research directed at specific areas. Short term investigations are also in progress on some private forest areas.

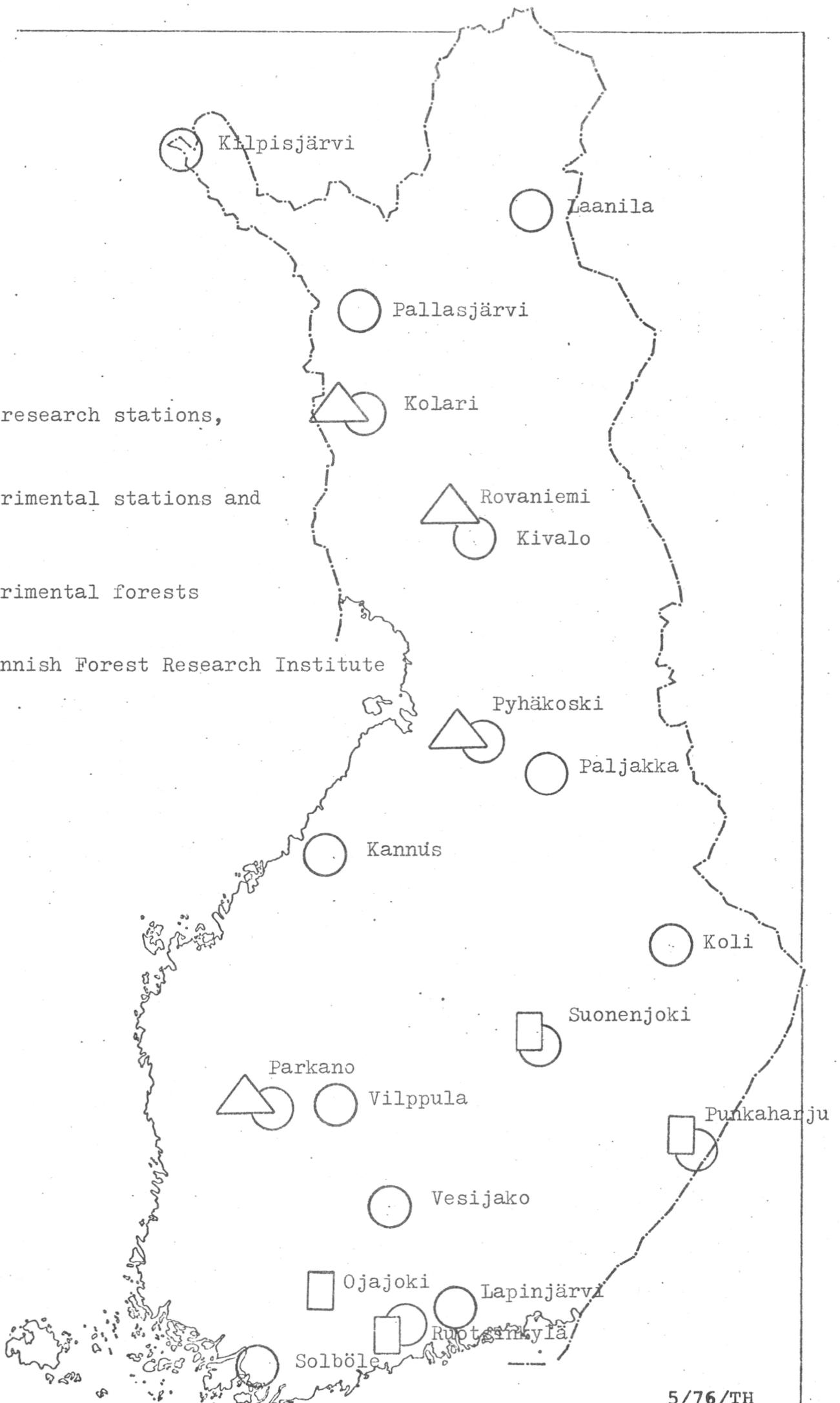
INFORMATION AND PUBLICATION ACTIVITY

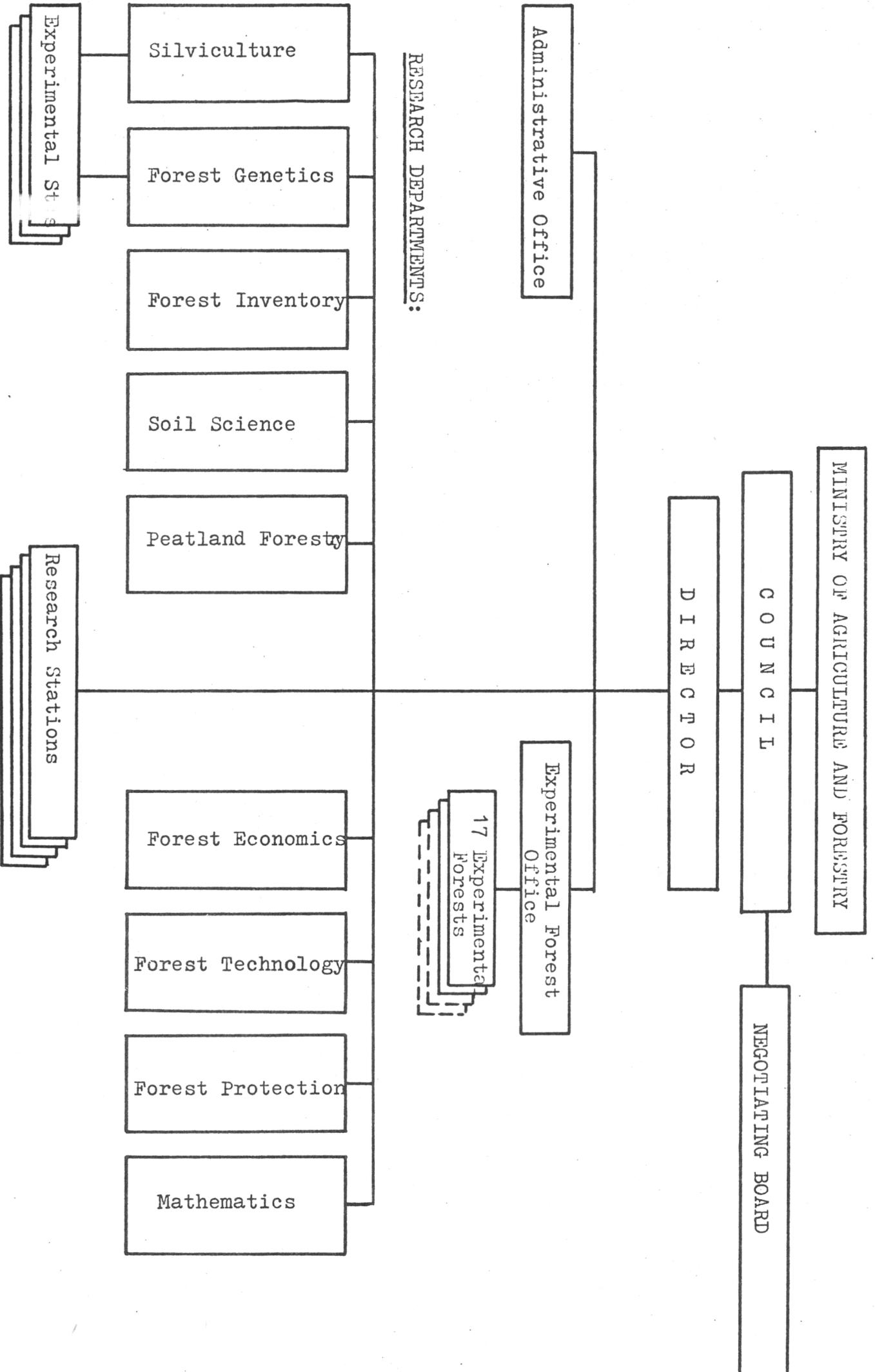
Research results are published in the two series issued by the Institute. *Communicationes Instituti Forestalis Fenniae* (*Metsäntutkimuslaitoksen Julkaisuja*) is published in volumes which usually contain five or six scientific papers. Between 1919 and early 1976 87 volumes had been published. The series *Folia Forestalia* is for short studies, preliminary results of long term projects and for the publication of research results for immediate practical application. Each study constitutes one number. By the end of 1975 approximately 250 issues had been published. It is the purpose of the information activity of the Institute to make acquired information and the contents of the publications accessible to everyone who needs it. Special attention is given to the proper channels and popular form in disseminating the research findings. Domestic press, professional and daily, as well as other news media are served regularly. Besides the official publications, the research bulletins of the research stations of the Institute serve this purpose.

For participants on excursions and for individual visitors there are printed brochures on some experimental forests in English. Requests concerning them and other information regarding the Institute should be directed to the Information Service of the Institute.

- △ The research stations,
- experimental stations and
- experimental forests

of the Finnish Forest Research Institute





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