SUOMEN METSÄTIETEELLINEN SEURA — FINSKA FORSTSAMFUNDET

SILVA FENNICA

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ACTA FORESTALIA FENNICA. Sisältää etupäässä Suomen metsätaloutta ja sen perusteita käsitteleviä tieteellisiä tutkimuksia. Ilmestyy epäsäännöllisin väliajoin niteinä, joista kukin yleensä käsittää useampia tutkimuksia.

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A CENTURY OF FINNISH STATE FORESTRY

1859—1959

ERKKI LAITAKARI

HELSINKI 1961

TAMPERE 1961
TAMPEREEN KIRJAPAINO-OSAKEYHTIÖ

MATURE PINE FOREST FOREST DISTRICT OF TAMMELA
Photo T Rancken

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Preface

This short presentation of the activities of the Finnish Forest Service during its first century is an abridgement of a comprehensive work published in Finnish by the Society of Forestry in Finland in its series Silva Fennica, No. 107. The reader should refer to the illustrations and maps of the original.

Helsinki, January 14, 1961

The Author

I The State, Development and Administration of State Forests

Initial Stages

The attention of the State was drawn to the uninhabited wilds at a very early stage. It was sought to promote their settlement so as to provide the State with new taxpayers. The process was being carried on as early as the 14th century, and the appellation "General State Lands" appears in the 15th century. But it was not until the 16th and 17th centuries that, by edicts issued by the Kings of Sweden, a firm foundation was laid for the State ownership of land. The edicts gave the State possession of all forest areas that could not be proved to belong to any holding, village or other community. Finland remained under Swedish administration until 1809; thus decrees enacted before that year applied to the whole realm of Sweden-Finland.

The separation of State lands from private lands only began towards the end of the 18th century. One purpose of this "isojako" (general parcelling of lands) was the delimitation of private holdings. Although this general parcelling of lands was started in Finland in the 18th century, it progressed very slowly especially in North Finland and has only reached its final stages during recent years.

The most fertile and advantageously located areas had been taken for settlement before the general parcelling of lands. Consequently the areas which remained in the possession of the State were rather barren and isolated from centres of population. And later on, as settlement encroached upon State lands, the most fertile and advantageously located areas were always the first to be relinquished. Thus the main concentration of State forest has been constantly shifting northwards. The growth of the forests has been correspondingly retarded, not only because of the sterile soil but also because of the increasingly rigorous climate.

Even before the general parcelling of lands began, there was some form of Forest Bureau for the administration of State forests. During the 17th century, the State Controller of Hunting was its highest executive and there were civil servants working for this Bureau in Finland

too. The institution did not seem to enjoy a high reputation and there were times when it was suspended. It cannot be assumed that the Controllers of Hunting and their assistants achieved much. However, they strove to follow developments connected with the forest and give the authorities relevant information.

At all events, reports dating from the beginning of the 18th century and the middle of the 19th century indicate that Finnish forests were in a very poor condition; at the latter date there was even a shortage of fire-wood and construction timber in some districts. This state of affairs was due to the shifting cultivation commonly practiced, and to the distillation of tar.

As the forests gradually assumed economic importance in the 19th century, the administration of the State forests began to receive attention. At that time, a far-sighted statesman, LARS GABRIEL VON HAARTMAN, held a key position in the government[1]). He fully understood the significance of forests for the economy of the country, and especially for the economy of the State. This was particularly important, since many able statesmen of that time did not realise the value of forests.

Mainly because of VON HAARTMAN'S energy and skill, a provisional Forest Service was established in this country in 1851; its officials were few in number, however. At first it was subordinated to the State Survey Office. It soon became apparent that this arrangement did not work out and in 1859 a permanent Forest Service was established; this was separated from the Survey Office to form an independent central office in 1863. The State forests were divided into 11 inspection districts with a chief district forest officer as the head in each, and into 50 forest districts administered by a forest officer.

A college of forestry was founded in 1862 to train skilled forest officers.

Area and Quality

The earliest data of the total land area of State forests are inexact. According to the documents the total land area in 1885 was 14.3 million ha. A more reliable figure, 12. 5. million ha., was reached in 1905.

The following figures show the course of development:

1925	13.6 mill. ha.
1935	12.9
1945	10.5
1955	9.4
1959	9.0

[1]) The country enjoyed considerable autonomy and had its own government (the Senate) while it was subordinated to Russia between 1809 and 1917.

The increase from 1905 to 1925 was due to the areas annexed to the country at the peace treaty of Tartu in 1920. The decrease in area from 1925 to 1935 was caused mainly by land settlement, and in 1935—1945 by the large-scale cessions of territory under the Treaty of Moscow in 1944. The decrease in the period 1945—49 was also caused by land settlement, which was particularly intensive on account of the evacuation of the population from the ceded territories.

The division of the total land area into classes of land utilization is given here for the year 1959 only. It was as follows:

Productive forest land	4 345 663 ha.
Poorly productive forest land	1 448 101
Waste land	3 229 833
Other land	20 685
Total	9 044 282 ha.

Poorly productive forest land generally consists of wooded swamps, waste land of treeless swamps, other land of arable land, building lots and roads.

The State forests also comprise considerable bodies of water — according to the statistics of 1959, for instance, more than 600 000 ha.

Notable areas of State forest lie outside the sphere of economic activity; the most important of these are the large protection forests in North Finland, areas reserved for settlement, and natural and national parks. In the northern forest regions 59.4 — 86.5 per cent of the forests lay in the sphere of economic activity in 1958, in the south the corresponding figures were 94.8 — 95.8.

The maximum number of forest districts in the State forests has been about 100; they numbered 82 in 1957. The average size of the forest districts in the northernmost forest region in the same year was 310 582 ha, in the southernmost 14 344 ha.

The bulk of forest land owned by the State is subordinate to the Forest Service. Only 267 859 ha. was administered by other State organizations, mainly (116 983 ha.) by the Forest Research Institute.

Growing stock

It was mentioned above that the forests of this country were in a very poor condition in the 19th century. This fact can also be seen from the timber-cruising results of State forests. Thus, the number of timber trees (at least 25 cm dbh) was about 80 million at the turn of the century, about 186 million in 1905—15 and 227 million in 1936—38. These figures refer to softwood except for the last one, which includes 4—6 million birch trees.

Thus the development of forests has been very favorable. The number of sawtimber trees (at least 25 cm dbh) per hectare has varied as follows:

1899	15.1
1905—15	34.5
1936—38	33.6
1951—53	29.3

There was initially a very sharp increase. Since then the decrease in the area of State land in the south and increased fellings have reduced the number of timber trees.

The number of sawtimber trees (at least 20 cm dbh) was divided between different tree species in 1951—55 as follows:

Pine	Spruce	Birch	Total
227.5 mill.	81.6 mill.	6.5 mill.	315.6 mill. trees

The proportion of spruce is small in the north and increases toward the south.

The following figures indicate the development of volume in the State forests:

1905—15	390 mill.	cu.m. solid measure
1921—24	590	—„—
1936—38	510	—„—
1951—55	348	—„—

In the last-mentioned volume the percentage of pine was 53.8 %, spruce 29.1 %, and birch 15.6 %. The proportion of other tree species was insignificant.

As regards the increment of growing stock in the State forests, a notable difference appears between the southern and northern halves of the country, as the following figures from the year 1951—53 reveal. The figures apply to productive forest land and indicate the mean annual increment.

North Finland	1.2 cu.m. solid measure per ha.
South Finland	2.7 —„—

The total annual increment according to the inventory of 1951—55, was 6.69 mill. cu.m.solid measure excluding bark. The share of the northern regions was 5.27 mill. cu.m.solid measure and of the southern ones 1.42 mill. cu.m. The above-mentioned total growth was divided between tree species as follows:

Pine	Spruce	Broad-leaved trees	Total
49.3 per cent	28.3 per cent	22.4 per cent	100 per cent

Age-class ratios have improved insofar as the proportion of the youngest age classes has increased since the beginning of the 1920's. However, there are still too many old forests, particularly in the north.

The silvicultural condition of the State forests, particularly in the southern half of the country, is clearly better than that of the private forests according to the national forest inventories (1936—38 and 1951—53).

Land Settlement

A number of dwellings had appeared in State forests even before the establishment of the Silvicultural Organisation; some settlers had permission from the authorities. Many came illegally, State forests, however were widely regarded as common property. Some of these dwellings were formed into new land holdings from the beginning and separated from State land. They totalled 1447 by the time the country became independent[1]), and had been given 315 761 ha. of land. Some dwellings were formed into tenant farms on State forest-land and these paid annual rent to the State. The total number of these tenant farms was 4 620 in 1921. In addition, there were 1291 smaller tenant dwellings and homesites. By virtue of a law enacted in 1922 almost all these tenant farms in State forests became independent, and since then their number has been insignificant. On the other hand there are hundreds of small tenant homesteads.

Actual land settlement activity, i.e., the final separation of holdings from State land, has been continued and intensified in accordance with several laws in the course of time. It became particularly intensive after the war when the population of the ceded territories was resettled. Thus, 2 005 745 ha. of State land were relinquished for settlement between 1922 and the end of 1959; 887 823 ha. from this area was made over by virtue of the Settlement Law enacted in 1945. About 2/3 of the relinquished area was forest.

From the point of view of State forestry, land settlement has been both beneficial and harmful. It has brought ready labour to the wilds and thus facilitated activities connected with forestry. Roads and paths, useful for logging, appeared as a consequence of settlement. But unfavourable effects of settlement on State forestry has also become evident. The fact that the best lands in the best market areas are the first to become settled has affected the profitabilily of State forestry. Parcelling out land is also very detrimental to the silvicultural and economic treatment of forest land. Moreover, settlers have frequently

[1]) This occurred in 1917.

requested and been granted lots from locations carrying large-sized timber and consequently they have had a chance of converting the growing stock into money. Forest utilization projects have also been badly shaken and it has been difficult to realize a longrange program. Similarly, numerous cutting prohibitions imposed on large areas by the settlement authorities have impeded rational forestry.

It is vital to set the boundaries between the areas to be settled and those to be used for State forestry. The Forest Service should be given better facilities for the supervision of settlement.

As a digression, it may be mentioned that State land has also been rented for industrial sites, for "generally useful purposes," etc. These rented areas are relatively small, embracing a total of little over 100 000 ha. at the beginning of 1958. Hundreds of new contracts, however, are being made every year. Revenue from the rented areas is modest.

Areas rented for the purposes of hunting and fishing are not included above. They will be treated in another chapter.

Grazing

Tenant farmers on State land and neighbouring inhabitants have allowed their animals graze on State land since ancient times. The Forest Service however has endeavoured to control grazing because of the harmful influence this is thought to have on the regeneration of forest. A small annual payment per animal was imposed for that purpose. In addition, reproduction areas were protected from grazing. In 1947, the number of taxable domestic animals was at its peak, 42 803. This was one of the consequences of war; the number of cattle was considerably above normal. In 1959, taxable domestic animals numbered only 10 058. Most of the grazing animals has been cattle, but since the war there have been nearly 5 000 sheep. From a silvicultural point of view the grazing of domestic animals on State land has all but lost its significance.

Reindeer are in an exceptional position as regards grazing; they are vital to the inhabitants of the northern part of the country. The development of conditions was followed closely by the Forest Service as it was observed that reindeer caused damage especially in reproduction areas. Grazing, however, was permitted free of charge for the time being. Much new light was thrown on the matter in 1911 when a special Committee was appointed by the Senate to study the question of reindeer as a whole. The enactment of the Senate in 1916 was based on the findings by the Committee. As a preliminary step, the enactment defined the southern border of reindeer husbandry as a line crossing the country at approximately the 65th northern latitude, though it

went some distance southwards in places. South of this border reindeer husbandry was not permitted, since these animals caused notable harm to farming. The total number of reindeer in the whole region of reindeer husbandry was fixed at a maximum of 105 150. A small grazing fee was imposed on animals more than one year old. This tax was considerably larger for animals exceeding the permitted maximum number.

Since then the provisions have changed, though the region of reindeer husbandry has remained broadly the same. In 1950, the maximum number of reindeer permitted increased to total 167 900. It is the duty of the reindeer-owners' associations to protect regeneration areas against reindeer damage.

Today (1959) reindeer number about 150 000 in all; 124 110 of them graze on State land and fees are paid for them. From the point of view of reindeer economy the present number seems to be too large. Lichen, the most important reindeer nutrient, is not sufficiently plentiful for so many animals. Damage caused by reindeer to regeneration areas does not appear to be so significant as earlier, probably because seedling stands are much more numerous now than they used to be and damage is therefore scattered.

Hunting and Game Management

Under the old statutes the owner or holder of land held the shooting rights. Thus it was stipulated in the regulations of the Forest Service of 1859 that the forest officer could hunt in his district to satisfy his own needs and the forest warden for his own profit. Hunting predatory species, however, such as bear, wolf and lynx, was permitted wherever they were found. The inhabitants of some north-eastern and northern districts have free shooting rights on State land.

The latest Hunting Act (of 1934) aims at the promotion of game management and it makes great demands on the Forest Service in this respect. The Act also provides that game management societies, responsible for the maintenance of game stock, shall be formed. A Game Controller was installed to watch over the hunting interests of the whole country.

To promote game management the Forest Service has protected considerable areas from hunting. In 1950 the total protected area was 273 000 ha., mostly in North Finland.

The Forest Service can, for a fee, give a private person permission to hunt on State land under its administration. About 1 000 such licenses were granted annually in the 1930s and as many as 1 570 in 1959.

Shooting rights have also been leased. In such a case the lessee undertakes to practice effective game management in the leased area. In 1959, the total area of such leased land was about 161 000 ha. and the number of contracts 81, most of them in southern forest districts.

Moose *(Alces alces),* the most majestic game animal in Finland, was rare at the turn of the century. With adequate protection, however, it has increased considerably. In 1953—57, 3579 moose were shot under license on State land, as against a mere 584 in 1938—42. The numbers of moose shot per area unit were gratest in the southern parts of the country, but the absolute figure was larger in the northern regions. — Shooting licenses for moose have yielded the Forest Service far more revenue than all other shooting licenses put together.

The Forest Service has been running courses for the promotion of game management in all regions since 1954.

Fishing and Fishery Management

State lands under the Forest Service include considerable bodies of water, 624 329 ha. according to the statistics of 1958. Since ancient times in Finland the owner of an area has enjoyed fishing rights. Thus the State has the right to fish in its own waters. According to Forest Service regulations, the forest officer holds fishing rights in his forest district and the forest warden in his ranger district. In some north-eastern parts of the country the local population enjoyed free fishing rights based on old customs. Because of the food shortage during the war it was necessary to grant universal fishing rights, which remained valid for several years.

The Forest Service has long been interested in the management of the fisheries under its administration. It had not much opportunity, however, until the new Fishing Law took effect at the beginning of 1952 Since then, fishery-industry plans has been drawn up for most water courses, stocking of valuable fish species has been carried on and relevant trials have been conducted.

The Forest Service can grant fishing licenses against payment to private individuals and make fishing-lease contracts with organizations and private individuals. The number of fishing licenses granted during the early part of this century was rather small, but by 1929 it had risen to almost 2 000. It has been growing rapidly since the middle 1950s and in 1959 it was over 10 000. The increase has been most notable recently in the number of licenses granted for fishing as a sport. The

number of valid lease agreements was 67 and they covered about 13 000 ha. of water. Revenue from fishing licenses and lease agreements is considerably larger than income from shooting licenses (not counting moose-shooting licenses). In 1959, the revenue in question was about 8 million marks.

Conservation of Nature

Signs of interest in the conservation of nature appeared in Finland as early as 1880, when the founding of nature parks was suggested. Several well known scientists and leading foresters supported the idea warmly. The Forest Service, too, favoured the idea from the start. It even closed several intact tracts of forest to cutting long before any relevant laws became valid.

The Nature Conservation Act was passed in 1923. It permitted nature parks and national parks to be separated from State land in localities renowned for their natural beauty. After much investigation the first nature reserves were founded in 1938. A considerable part of these however were in the area ceded after the war. The question became once more a subject of debate. As a consequence a number of new nature reserves were founded in 1956 after which there were 14 nature parks and 9 national parks in all. The largest parks are in North Finland. Together they represent a cross section of the nature and scenery of the whole country. Their present areas are as follows:

nature parks	866.4 sq. km.
national parks	1 040.1 sq. km.
total	1 906.5 sq. km.

Two of the national parks and four of the nature parks are administered by the Forest Research Institute, the others by the Forest Service.

In addition, a number of natural monuments — notable trees or groups of trees, waterfalls, large boulders etc. — have been protected by virtue of the Nature Conservation Law. The number of these on State land is 73. In addition to the areas mentioned above, the Forest Service has protected large areas of its own land either because of their scenery or to retain them in their virgin state.

Closely connected with nature protection is the organisation of camping, in which the Forest Service has taken an active part with regard to its land. This form of relaxation, which has become more common particularly since the war, is most frequent in the wilds of North Finland. To protect forests from devastation by fire and other damage, the Forest Service has set up camping areas in suitable localities, and provided

them with fire sites, fire-wood, swimming facilities etc. In 1959 the number of such camping areas was 38.

Without doubt the Forest Service deserves part of the credit for the present level of the conservation of nature in this country today.

Protection Forests

Large areas of State forest in the north of Finland are exposed to damage because of their location, and are in need of special protection. As early as in 1901 a committee studying State forestry turned its attention to this matter. The Committee concluded that a special protection-forest region should be separated by a border 30—50 km south of the limit of coniferous forests. Close investigation was devoted to the matter but not until the Protection-Forest Law was put into force in 1922 was it possible to carry out the final demarcation of the region, which was to comprise, roughly speaking, the part of the country lying north of the 68th latitude.

In 1958, the area of protection-forest under the Forest Service was over 3 million ha. Only a small part of this area has been within the sphere of active forestry so far. It includes a belt of shrubby birch covering 1/2 million ha. with hardly any economic significance whatever.

Methods of managing forests in the protection-forest region are at present under close study, and it has not been possible so far to issue any definite instructions. It is possible however that a more active form of management will prove necessary.

Damage

The worst devastation has been caused by forest fires. As much as twenty thousand hectares of State forests have burnt during bad years, even in recent times; in the last century the figures were sometimes much higher. Even in the worst cases, however, fires cannot spread very far because of the numerous waterways and moist swamps. The largest area burnt in a single fire in recent decades was 124 ha. In years with few forest fires, the total area burnt in the State forests is only some hundreds of hectares and single fires are limited to a few hectares.

Almost half of the fires in State forests have been started by lightning. Other important causes of fire are camp fires and smoking.

The Forest Service has shown a serious interest in fire control for a long time. One indication of this is that reliable statistics on forest fires have been compiled since 1865. One of the most important duties

of forest wardens was to watch out for forest fires. Look-out towers were began to be built on high ground during the 1920s and were manned from early summer onwards. Iron towers were built, starting in the 1950s. Today the total number of look-out towers is 104. In addition, fells and other high points on the terrain are used as look-out posts. These are equipped with direction-finding instruments, telephones, and, nowadays, often with radio-telephones. If necessary, even airplanes are used for observation. This was done for the first time in 1927. To prevent the spread of forest fires the Forest Service has had bicycle paths built, fire lanes cleared and fire-fighting equipment placed in suitable places. — Incidentally, too, the burning over of cut areas, nowadays a common silvicultural practice, has considerably increased the skill of fire-handlers and has thus indirectly helped to increase fire-fighting efficiency.

The constant improvement in the organization of observation and fire-fighting has notably reduced devastation, though in dry summers damage can still be extensive.

After forest fires the most common cause of destruction is storms, though the economic damage done by these is not so great. The main season for storm damage is from June to October — and up to November in South Finland. Damage is rare in winter, although storms are more frequent then, because the freezing of the soil prevents uprooting. October is an exceptionally dangerous month. Storm damage is rarer in North Finland than in the south. This is partly owing to the shorter period during which the ground is not frozen, but mainly to the fact that heavy storms are less common there than in the south. Winds blowing from the SW, W and NW cause much more damage than NE, E and SE winds.

One of the worst years of storm devastation was 1921, when 647 000 large timber trees and 54 000 cu. m. of cordwood were uprooted.

Damage caused by snow can be serious enough in the southern half of Finland, but the most frequent occurrences are in the NE parts of the country, in areas of high altitute and heavy snowfall. Snow damage in State forests was worst in the winters of 1947—48 and 1958—59. During the intervening years only minor losses occurred.

Data on damage by insects and fungi are given in the forest statistics almost annually. Serious damage is rare, however. Frequent diseases worth mentioning include *Cronartium peridermi pini, Phacidium infestans* and *Melampsora pinitorqua*. Damage by insects is recurrent: *Blastophagus, Hylobius abietis, Lophyrus* and *Noctua piniperda* are among the most common.

Moose injure young pine stands — more in the south than in the north. These animals have become more common in recent decades and therefore more attention is being paid to the damage they do.

The illegal utilization of forests was very common in the early years of the Forest Service, because State forests were traditionally regarded as common property. At the beginning of the 20th century illegal utilization decreased considerably and in the 1940s it ceased almost completely.

Development of Forest Service

Before Finland became independent, the Forest Service was subordinated at different times to three different departments of the Senate (corresponding to ministries). Since Independence (1917) the Ministry of Agriculture has been the highest instance. Frequently an arrangement has been practised by which the Secretary of Agriculture has been responsible for agricultural matters and the Under-Secretary for forestry matters. It has also been endeavoured to organize the work of the Ministry in matters of forestry by founding a special Forest Office, the officials of which, being skilled foresters, have drafted matters to be treated.

As mentioned in the chapter dealing with the origin of the Forest Service, the field organization was formed by chief district forest officers and their subordinate forest officers and wardens. To start with the field organization also included forest overseers who had received some education, but no vocational training. These posts were only intended to be provisional, and were discontinued in 1904. Forest wardens were men known to be reliable, who were able to read and write. — The officials in the central office were few in number. In addition to the Chief they included an engineer, a secretary and three forest officers.

The field organization retained this form for a long time. Only the numbers of inspection districts and forest districts varied.

The provisional Forest Service was headed by A. von Rechenberg in 1851—54, and in 1854—59 by C. W. Gyldén, a very distinguished figure in the field of forestry. Gyldén was also head of the permanent Forest Service until 1863, when the Forest Service became a separate central office with R. Z. Wrede as its Chief.

At first great difficulties were encountered and, since State forestry showed a continual loss, Wrede resigned in 1870. His successor, A. af Forselles, held office until 1893. He observed frugality and conservatism in directing State forestry. New regulations, however, were enforced and at the same time the personnel of the central office was increased:

an assistant to the Chief, a head accountant and a clerk, were added. On the other hand, owing to poor economic yields, af Forselles had to reduce the number of supervision districts (and consequently the number of chief district forest officers) from 11 to 7. The number of forest districts was also reduced. When the Forest Service was later granted funds for purchasing new forest areas, new districts were formed, and thus the final number remained unchanged. Progress was slow at the time af Forselles was in office, but gradually State forestry began to pay its way. The last unprofitable year was 1879. Af Forselles resigned at an advanced age and was succeeded by Ernst Wrede the first Chief with professional training; he had taken a course at the Finnish College of Forestry. During his short term of office (1893—1902) Ernst Wrede followed the conservative line of his predecessor. The period of his and af Forselles's administration can be called one of the gradual revival of the Forest Service.

A new era began in State forestry when P. W. Hannikainen assumed leadership in 1902. He was a skilled professional forester whose energy and initiative were well-known. He achieved popularity by advocating new settlements, wheras his predecessors had recommended the leasehold system. He took office at a fortunate time, when the demand for wood was rapidly increasing. The surplus of State forests began to rise sharply, which lent justification to all the reforms of the Administration. In 1908, a new ordinance appeared: the personnel of the Central Office was increased to include 13 important officials, apart from the Chief. On the other hand, the office of the Assistant of the Chief was discontinued. The Forest Service now became a collegial office, wheras previously the Chief alone had made the decisions. In addition, the Forest Service received a new, spacious office suite. The field organization was expanded. The number of supervision districts rose to 9 and that of forest districts to 87.

Swamp drainage began under the supervision of 6 forest officers during Hannikainen's term of office. New schools for training forest foremen were founded three with a 2-year course and one with a 1-year course. The Forest Service also turned its attention to the processing of wood: three sawmills were acquired. An important feature, too, was the commencement of fellings by the State. Hannikainen's term of office, a 16-year period of strong leadership, ended in 1918.

His successor was Dr. A. K. Cajander, Professor of Silviculture at the University. He was the first head of the Forest Service to work for an independent State. His long term, covering the period 1918—1943, was one rich in events. Cajander was an exceptionally energetic and

intelligent man, who in a short time reformed the Silvicultural Service and, above all, converted it into a business enterprise. Simultaneously, too, he struk a new course in the silvicultural treatment of forests. As early as 1921, new regulations were worked out, a statute for the reorganization of the Forest Service was enforced and a new division of forest districts effected. — Perhaps the most important of the many innovations was replacing the institution of chief district forest officers by a system of forest regions with regional chiefs, and regional offices and staffs. The aim was to satisfy the long-felt need for decentralization. Where possible, local questions were left to the decisions of the officers who were most familiar with the conditions. Thus the burden of the Central Office was lightened and there was more time to consider important questions bearing upon the whole forest administration. According to the new system there were four regional offices headed by a director and under him district inspectors (12 at first, 11 since 1940) and other officials. There were 84 forest districts subordinate to the forest regions, plus 6 independent forest districts. According to the principle of the new division into districts, their borders were to follow the natural boundaries, so that each forest district would lie within a single water-system area.

According to the new ordinance, the Central Office consisted of two divisions, one for matters concerning State forests and the other for matters bearing upon private forests and the schools foor training forest foremen. The first division was the more important. It was divided into four sections: Management Plan, Land Utilization and Settlement, Engineering, and Business. Both divisions shared the secretarial office, accounting office, and statistical office. The total number of officials in the central office exceeded 50. According to its Statutes the Forest Service is a collegial civil service department. Each division meets separately, but whenever necessary they hold joint meetings. The office of the Assistant Director-in-Chief, which had been discontinued, was re-established.

As the number of personnel of the Forest Service had increased considerably, a new and more spacious office suite was acquired. The office is still housed here, though much more space has been acquired since then.

The Business Section became particularly important in CAJANDER'S time. A number of offices representing different aspects of business activity came under this section.

One of the great reforms initiated in CAJANDER'S time was the development of woodworking industry of the Forest Service, which will be dealt with in a chapter on business activity. Other reforms were the

development of schools for training forest foremen ("ranger schools"), and the replacement of forest wardens by trained forest foremen. In addition, the use of forest site types as the basis of silviculture became established during his time.

The development of the Forest Service under CAJANDER'S leadership proceeded under peaceful conditions for two decades, though it was troubled by the heavy depression of the 1930s. The last years were difficult times of war. — As early as in the 1920s CAJANDER took an active part in politics; he became a Cabinet Minister several times and remained a Member of Parliament during the whole period. All this heavily taxed his time and energy, but, on the other hand, his influential position helped him to promote forestry. At all events, the time during which CAJANDER held office was one of the best for the Forest Service. His life ended during the war. He was in the possession of full mental powers till the end, although depressed by certain disheartening experiences of his political career.

In 1943, during difficult times, Mr. MAUNO PEKKALA became head of the Forest Service. A man of great merit in forestry, he was called on, almost immediately, to tackle exacting political problems. Thus he could only direct the general lines of State forestry. After the war the resettlement of the evacuated population and other settlement activity, and the rebuilding the dwellings destroyed in North Finland during the war, caused much trouble. The area of State land had been considerably diminished by cessions of territory. The number of forest districts had fallen to 82.

It was under these conditions that Professor N. A. OSARA became the Chief of the Forest Service after Mr. PEKKALA's death in 1952. Professor OSARA, the Director-General (a title introduced during CAJANDER's term of office), however, had Dr. LAPPI-SEPPÄLÄ as his deputy. The latter had been appointed Deputy Director-General in 1945 (previously the title had been Assistant-Director-in-Chief). OSARA worked, in the main, within the organizational framework created by CAJANDER. He strove to overcome the prevailing difficulties by rationalization and mechanization. He succeeded, with his associates, in making State forestry remunerative without neglecting silvicultural requirements. The rapid development of logging techniques and transportation facilites deserves special mention. A Forest Administration Committee headed by OSARA planned to organize the Forest Service on a completely new basis with particular emphasis on facilitating business-economic management. There can be no denying that the organization created by CAJANDER had become outdated and inflexible; it had been subject to several amendments. The new system planned has not progressed beyond the bill state (the bill

was published in 1959). OSARA was given no chance to work for its realization, because he was dismissed from his post as Director-General in 1960, and Mr. ANTERO PIHA, who holds a doctor's degree in forestry, was appointed his successor. Dr. PIHA had previously served as head of the Section of Forestry Policy of the Central League of Agricultural Producers.

Field Personnel of Forest Service

The backbone of the field staff has always been the district forest officers. They have always enjoyed a relatively independent position in their forest districts and this has been a deliberate policy. In fact, management plans drawn up by revisors for a 10-year period at a time lay down the general lines of activity, but the execution lies in the hands of the district forest officer. Field activity is of course subject also by instructions from higher officials (previously the chief district forest officers, nowadays the regional chiefs and district inspectors).

The district forest officers were formerly aided mainly by forest wardens, of which there were several in each district. Because of their local knowledge the forest wardens were indeed useful, but since they were largely uneducated they could only be entrusted with simple assignments. In the northern forest districts the forest officer was also aided by so-called forest overseers, who were men with some booknowledge, but no vocational training. The most they ever numbered was about 30. Intended to be provisional, this office was discontinued in 1904.

Since the first decade of this century the district forest officers began to receive skilled aid from two different sources. Firstly young graduate foresters were assigned positions as assistants in forest districts. These assignments however were short and random. The status of supernumerary foresters became better established in the 1920s and 1930s, and since then they have provided many forest districts with competent professional aid. At the same time the idea gained ground that the forest wardens should be gradually replaced by forest technicians, who had attended a school for forest foremen. As a consequence, the number of forest wardens (800 at its maximum) began to decrease and that of forest technicians to increase. Forest technicians proved to be of valuable and permanent assistance to district forest officers. They could be entrusted with a great variety of exacting tasks.

To cope with the ever-increasing clerical work, forest districts began after the war to engage clerks. Each district now has a clerk, thus leaving the forest officer more time for his essential duties.

Since the number of regular forest wardens has been falling rapidly

during recent decades and new men have not been taken on, it has become necessary to employ extra rangers for simple tasks.

The numbers of personnel in the categories mentioned above are at present: district forest officers 80, assistant foresters 161, forest technicians 299, clerks 75, regular forest wardens 4, extra rangers 415.

In addition to the district administration staff, the field personnel included varying numbers of forest management revisors, forest appraisers, forest officers responsible for swamp drainage, engineers and building contractors, the teaching staff of the schools for forest foremen and the officials of the regional forest offices.

Housing is an important factor in easing the working conditions of district personnel. Thus a modest dwelling with some cultivated land always formed part of the emoluments of the regular forest wardens. Wherever necessary the State has provided forest officers and technicians with suitable lodgings. A considerable number of these officials live in State-provided lodgings at present. It has also been necessary for the State to provide housing for many assistant foresters and clerks.

II Measures to Increase Returns of State Forests

Forest Management

In the beginning, it was endeavoured to apply a system of annual cutting area to State forestry, and this was actually practised in the forests of State-owned estates. Elsewhere it proved to be unsuitable under the prevailing conditions. Even before the turn of the century, management by the selection system had gained popularity. Officially this system was only to remain in force until 1907, when it was intended to resort to management by stands. A knowledge of tree stands was to be the starting-point of all measures. And management was to be based on a description of the quality of the soils and forests, and on mensurational data, all determined by compartments according to a forest map. The selection system however remained predominant.

Not until the first years of Finland's independence was forest management given a new orientation, when the revision of forest working plans assumed a predominantly silvicultural character. Previously it had been purely mensurational. Now, the forest site type became the basis of mensuration, and the future management of the tree stand was planned on this basis. Special attention was to be paid to the question of whether the stand called for regeneration or whether it was worth allowing it to grow further. This would enable the quantity and quality of timber for cutting to be determined. A felling plan was based on the total removals calculated by the cruising of forest stands. Since 1926, plans for fellings and other measures have been indicated on management maps with different colours.

The degree of success achieved by the management is determined, for each 10-year period, by silvicultural revisions.

After the war, special attention was paid to drawing up concentrated cutting plans. Economic considerations made it necessary to organize extensive working areas, generally situated in remote regions.

The felling plans and the actual felling removals according to the forest regions, as computed by the Management Plan Section, are presented below. These figures, which apply to the year 1958, give an idea of the quantities of wood per ha. that can be cut in different parts of the country.

	Far North	Ostro-bothnia	East Finland	West Finland	Total in all regions
	cu. m. per ha. excluding bark				
Allowable cut	1.44	2.04	2.81	3.13	1.82
Actual cut	1.23	2.19	4.06	4.14	1.90

The total annual allowable cut in State forests for 1956—65 is 6 710 000 cu.m. solid measure excluding bark.

One of the most important tasks in forest management is making reliable maps. The first resurveys were carried out as long ago as 1860. Most State lands had been mapped by the 1920s.

After the war, a new era in mapping began when aerial survey came into general use. Maps more accurate than before could be made at lower cost. By 1959, nearly 2 million ha. had been mapped by this method, mostly to the scale of 1:40 000.

Since 1884, the Forest Service has employed varying numbers of forest appraisers and revisors of forest working plans.

Silvicultural Treatment of Forests

In the early years of the Forest Service, little silvicultural work could be done. Foreign tree species were sown or planted in various locatities. The Forest College initiated such measures as sowing pine in connection with shifting cultivation. The area sown attained 100 ha. for the first time in 1899, and 1 000 ha. in 1912. As regards regeneration cuttings, it was possible in exceptional cases only to use a system other than cutting to minimum diameter. A change of principle took place in 1919, when CAJANDER published a comprehensive circular on silviculture, clearly condemning the practice of cutting to minimun diameter. Also in other respects the circular gave clear silvicultural instructions and recommended compliance with them. It took some time, however, before cuttings to minimum diameter were discontinued. Some improvement could be seen in the condition of the State forests when the results of the second national forest inventory in 1936—38 were compared with the corresponding inventory of 1921—24. Thinning, for example, had become a fairly common practice, though it had not always been carried out to perfection.

The year 1929 saw a notable step forward in the opportunities afforded to manage State forests in accordance with silvicultural principles. In

that year the Forest Improvement Act was put into force, and considerable funds were consequently granted for the artificial regeneration of forest and swamp drainage also on State land. Results could soon be seen. The area treated by direct seeding, for instance, had been 6 400 ha. in 1928, but in 1934 it was 16 000 ha. Artificial regeneration, of course, was set back by the war, but by 1958 the pre-war sown area had been attained and the planted area had increased five-fold.

The war also brought about a decline in silvicultural cuttings. Since the conclusion of peace, neglected silvicultural principles have been readopted as far as possible. Clear cuttings have indeed been generally practised in remote regions, but the necessary subsequent renovation work has usually been effected as soon as has been practicable. These efforts have been aided by increased appropriations for silvicultural activity and by the speeding-up made possible by mechanization. Cuttings under the seed-tree system with a view to natural regeneration have been even more common than clear cuttings. In 1958, the area cut clear was 25 009 ha., and that cut under the seed-tree system 29 052 ha. Of particular importance since the war have been clearings of cutting areas, including those neglected earlier. In 1958, such clearings covered more than 100 000 ha. The burning over of cutting areas has also increased considerably, covering almost 16 000 ha. in 1958.

Clearing and thinnings in young tree stands have considerably exceeded the pre-war level. They covered a total area of 38 129 ha. in 1939 and 60 677 ha. in 1958. On the other hand, ordinary improvement cuttings have not reached the pre-war level.

The mechanization of silvicultural work has greatly increased since the war. Seeding spots have been prepared entirely mechanically. The results already exceed the best pre-war achievements. A new form of mechanization is a method developed since the war: the felling of stands of cull-trees by their roots, using a wire rope strung between two caterpillar tractors. In 1957, 2 500 ha. were treated by this method. After an area so treated has been burnt over, it is ready for seeding.

Owing to increased planting, it has become necessary to set up a couple of large, fully mechanized nurseries. To obtain seed, modern seed-extracting plants have been built.

The Forest Service has been working for the future by taking part in the search for elite trees and tree stands, and in the establishment of seed orchads.

Swamp Drainage

The Forest Service first undertook swamp drainage in 1908, when two forest officers interested in this work were added to the pay roll. Their number has been increased several times since then. In 1935 they were 9, assisted by a number of forest technicians, specially trained for this field. At present, the need for personnel is smaller, as working methods have been improved. CAJANDER's investigations created a scientific foundation for this work.

Before the war, all drainage was done manually, and the situation remained much the same until the 1950s. Since then the tractor-drawn ditching plough has superseded the spade. Ditchmaking by means of explosives is still used sometimes, particularly in swamps with many fallen trees lying buried in the peat.

In the early days, 100 m. of ditch per ha. were thought to be enough. Experience has proved that twice as much is required, on the average. Ditches used to be deep and dug at long intervals, wheras now they are made relatively shallow and placed at short intervals.

In the removal of rocks, drilling machines and blasting have superseded stone-lifting apparatus.

Much attention has been given to the maintenance of ditches, since otherwise work might have been wasted. In recent times, experiments have been made with ditches filled with tree branches, and with covered ditches; these do not require any maintenance.

The 11-year period 1929—39 and the 7-year period 1952—58 serve for comparison of drainage results. The output during the former period was 25 466 km. of ditch, i.e. 2 315 km. per year. The corresponding figures for the latter period are 17 813 km. and 2 545 km.

Within our present borders, the area drained or in the process of being drained totals 283 083 ha. A sizable part of this area has been taken away from the control of the Forest Service. The present area is 186 895 ha.

The bulk of the total drainage area has been drained by reclamation foresters. District forest officers have also participated — particularly during the early years.

The forest plough has had an enormous effect on the cost of drainage. Thus, the cost, per metre, of digging new ditches shows the following development:

1951	1953	1955	1957	1959	
141	137	62	58	17	Fmk per metre

The fall in cost is all the more significant in view of the constant rise in the general level of prices over the same period.

Development of Transportation Conditions

In the early years of the Forest Service, roads were constructed in some forest districts to improve the internal connections. This work was stepped up in the beginning of the present century to such an extent that engineers and building contractors were engaged by the Forest Service to plan and supervise the undertakings. And in 1921, a special Engineering Section was added to the Forest Service. From then on, construction work became more effective. Road building in the 1920s and 1930s was of a general character. However, a narrow-gauge railway 68 km long, which was built at that time, was closely connected with forestry. Construction of floating channels in those decades was relatively insignificant because of the lack of appropriations.

Around the year 1945, this work received fresh impetus from several sources. Log-hauling by trucks was being stepped up rapidly and the construction of forest truck-roads became very important for forestry. With increasing mechanization, the construction of roads and floating channels became less time-consuming and cheaper than before. And the Forest Service's appropriations for such work increased manifold as soon as unemployment grants were made for them.

Here are some examples of the results:

	Finished forest truck-road, km.	Floating channels constructed, km.
1945	14	465
1950	212	652
1955	310	365
1957	453	201

The thickening of the road network and the increasing of floating channels at such a pace has greatly influenced the profitability of forestry. It has been influenced by other large-scale enterprises of the Engineering Section, such as the construction of equipment to enable logs to by-pass power plants on waterfalls.

In 1955, as mechanization continued to grow rapidly, a Board of Mechanization and a Machine Office were founded as organs common to all Sections of the Forest Service. With a view to repairing and developing different types of machines, depots were established with the necessary buildings and equipment during the 1950s.

III Business Activity

The first decade of the Forest Service, the 1860s, fell short of expectations as far as the commercial activity was concerned. The sawmill industry was backward and those years were characterized by a severe famine. In the beginning there were also some administrational obstacles. Conducting affairs in the field was slow and inflexible. Sawmill owners preferred dealing with private forest owners. Since, furthermore, the Forest Service stubbornly stuck to the prices it considered moderate, sales were not concluded and economic losses were sustained.

The beginning of the 1870s was characterized by a thriving sawmill industry and an economic boom. The Forest Service's sales went up, and in 1874, for the first time, a delivery of 900 000 stems was attained. By then, too, the proportion of export lumber originating from State forests had risen to 24 per cent. In 1872—75, the commercial side was showing a profit, one that rose as high as 1.5 mill. Fmk in 1874, an exceptional sum under the prevailing conditions. In the following years the situation deteriorated owing to a world-wide depression, but gradually the trend turned upwards again, and 1879 was the last year in the annals of the Forest Service to show a loss, unless the war year of 1940 is counted. From the commercial point of view the 1880s were a quiet and cautious period. The economy, however, showed some profit. In the 1890s, the continued success of the sawmill industry offered better prospects and the new century began with a peak profit of almost 4 million Fmk.

At the turn of the century there was an important development: the Central Board of Railways began negotiations for the acquisition of timber from state forests. In 1901 an experimental procurement took place, and thus began the ever-increasing procurements of the Forest Service. In 1910 they covered 32 forest districts. Deliveries of timber to the State Railways led the Forest Service to establishing its own sawmills, since cuttings produced forms of timber that the Railways did not want.

The first sawmill was founded next to a railroad line in South Finland in 1905. Four years later two new sawmills were acquired. From the Forest Service's point of view the results were satisfactory.

A great variety of experience was gained not only in delivery but also in exporting lumber, since the profitable operation of the sawmills called for exports. The first sawmills were small, but in 1920 the construction of a large one on the seashore, by the esturary of the great River Kemi, was put under way. In 1924, a 6-frame sawmill at Veitsiluoto ran at full capacity producing about 20 000 standards per year. At about the same time two small mills were withdrawn from operation. A third small mill was expanded and in 1924, its production was about 1/3 Veitsiluoto's. A sulphite pulp mill was set up in the vicinity of the big sawmill and began operations in 1930. This permitted the large amount of waste wood from the sawmill to be used profitably. Soon, however, the industrial establishments of the Forest Service were made over into a company in which the State owned the majority of shares. Transfer to this company, which was named Veitsiluoto, took place in 1932.

After the above review of the Forest Service's 25 years of industrial operations, there follows a résumé of its other business activities.

The favourable trend continued up to World War I. As a dominant aim was to make the North Finnish State forests competetive and create a demand for their products. With this end in view, very large sales were concluded in these areas in 1909—17; as much as 20 year's, time was granted to the buyers for the removal of timber bought. Millions of large timber trees and considerable amounts of cordwood were sold in these so-called concession sales. Some of these sales later proved to be unprofitable owing to the inflation which followed on the heels of the war. But in any case they created a demand in the northern areas and brought the economic surplus to an all-time high.

Great difficulties were encountered during World War I. The East however was open to free export and, in particular, the demand for firewood was almost unbelievable. The proportion of firewood in the deliveries, which had been only a few per cent before the war, exceeded 30 % in 1917.

The Forest Service came out of the war fairly well; in no year was the balance short.

After the war the situation was different. New markets had to be found and the business economy of the Forest Service called for reform. In his inauguration speech the new chief of the Forest Service, A. K. Cajander, stressed that State forestry would be conducted according to sound business principles. In conformity with this policy, rapid progress was made. The newly gained independence of the country served as a further incentive.

The expansion of the sawmill industry has been touched on above. Delivery logging also increased strongly. This led to the direct export

of pulpwood and pitprops. Beginning in 1922, this export has continued without interruption and has constantly increased up to the present time. Because of the large number of lines, four offices were set up under the Business Section to deal with the different facets of business. In general business activity was profitable. One exception was a concession sale of 3 million timber trees concluded against the protests of the Forest Service in 1921, for which the clients were given 9 years' removal time. This sale proved to be very unprofitable. The great world slump of the early 1930s put the business economy of the Forest Service to a rigorous test and decreased the surplus considerably.

Business difficulties were encountered when World War II broke out and Finland became embroiled in it. Goods could be exported to Germany alone. Industrial establishments limited their output, and this decreased sales from State forests. In logging, first priority was given to firewood and charcoal wood. A special Charcoal Office was set up under the Forest Service; it attended to the procurement of charcoal and chopped wood for cars and trucks for the duration of the war. In the final stages of the war the Office provided tar for the production of lubrication oils. As the war went on, the maintenance of logging camps became more difficult year by year. Adaptation to war-time conditions however was remarcably successful. Thus, only one of the war years, 1940, brought an economic loss; the others showed a tolerable surplus.

After the war, too, the situation was exceptional. Maintenance conditions were difficult. Reconstruction in Lapland called for quick measures, and to cap everything, continual inflation obstructed commercial activity and disrupted wage agreements. But even in 1946 the financial result was satisfactory. A characteristic feature of the post-war period up to 1949 was the increase in the sales of standing timber at the expense of delivery sales. The sale of standing timber reached its peak, 75.6 per cent, in 1947. But in the early 1950s delivery sales again became the most important form of marketing.

The timber markets in the early 1950s were marked by the boom brought about by the Korean War. In regard to the surplus, one of the best years was 1952. The boom however soon ended and prices went down. The amounts of timber sold began to rise, however. In 1952 3.5 mill. cu. m. and in 1954 over 6 mill. cu. m. was delivered.

In 1943, after the death of A. K. Cajander, Mr. Mauno Pekkala became head of the Forest Service, and was succeeded in 1952 by Professor N. A. Osara whose term of office lasted from 1952 to 1960. It had become more difficult to show a profit because State forests had decreased considerably due to cession of territory and the extensive land settle-

ment after the war. Prices, too, were very low for some years after the Korean War. Since fellings have had to be extended to more and more distant regions, concentration of operations, rationalization and mechanization have been called for to maintain profitability.

Timber is sold from State forests by auction, contract or retail. Sale by auction continues to be of importance, although for many years the main part of timber has been sold by contracts. Retail sale usually covers small amounts to local people. The above-mentioned concession sales were contract sales with unusually long times allowed for removing the timber from the forest.

As mentioned above, trees are sold either standing — in which case the buyer takes care of felling and hauling — or delivered, with felling and hauling carried out by the Forest Service. The following figures show the ratio of delivery sales to the total amount of timber sold in different years:

1906	1912	1918	1924	1930	1936	1942	1948	1954	1958
6 %	7 %	35 %	19 %	51 %	55 %	66 %	24 %	72 %	73 %

The figures below indicate the distribution of the total delivered quantity into different assortments during certain years:

		1950	1952	1954	1956	1958
Large-sized softwood	1 000 cu. m. solid measure	2 934	1 882	2 841	3 186	2 797
Large-sized hardwood		27	43	45	41	45
Paper and pulpwood		1 396	804	2 337	2 444	2 257
Firewood		967	808	1 316	789	777
Total		5 324	3 537	6 359	6 460	5 876

The following figures give the surplus from State forestry in averages for 10-year periods (the last period is 8 years). The sums of money are shown in finnmarks converted into their 1958 value. Only the present century is considered.

1901—10	1 193	million Fmk per year
1911—20	1 245	—„—
1921—30	2 429	—„—
1931—40	2 258	—„—
1941—50	2 367	—„—
1951—58	2 750	—„—

The surplus (Fmk) per ha. of land per forest region in 1954 and 1958:

	1954	1958	
Far North	178	312	Fmk per ha.
Ostrobothnia	788	1 074	—„—
East Finland	2 138	2 926	—„—
West Finland	2 856	3 950	—„—
Mean for all regions	741	945	—„—

IV Employment and Welfare of Employees

Along with the development of State forestry, there has been a notable growth in its permanent personnel, as the following figures indicate:

Year	Forest officers etc.	Forest technicians	Permanent forest wardens
1900	121	—	707
1930	200	139	748
1958	368	299	7

Forest wardens have been replaced by forst technicians who have completed a 2-year course in a school for forest foremen, and by supernumerary rangers. Almost all the forest officers etc. are graduate foresters. Including assistants, the number of employees drawing pay all the year round is almost 2 000.

The predominant forms of employment offered by the Forest Service are logging and hauling, and they take place mainly in winter. In the last century the Forest Service's own fellings were generally limited and consequently there was little work available. On the other hand, the country was more thinly populated.

In the present century, figures indicating man-days of work are so large that it is more practical to speak about man-years of work.

The following series of figures shows the course of development:

	1906	1916	1926	1936	1946	1956
Logging and hauling, man-years of work	447	1 797	2 470	5 514	4 851	9 661

Felling and rough conversion calls for the greatest part of the manpower. In the last years (1953—59), 49.2—57.4 per cent of the total labour force has been thus employed. The corresponding figure for hauling is 11.9—16.9 per cent. No other form of work has exceeded 10 per cent.

The work is distributed very unevenly throughout the months of the year, with a peak in January and February. Forest activity is at its

lowest in July and August. The following figures show the total number of workers in 1958 during the months mentioned:

January	February	July	August
25 447	24 885	4 458	4 008

There are considerable numbers of men at work even at quiet times. The trend is for summer work to increase.

The following figures for January 1958 demonstrate the mechanization of forest work:

Horses	Trucks	Tractors	Power saws
7 703	356	264	2 612

The horse still has his place in forest work during winter. When the ground is bare, motor vehicles play a decisively more important role. — The power saw has become so common that in 1959 almost one third of all men employed on felling and rough conversion possessed this tool. The corresponding proportion in 1956 was 6 per cent.

The effect of mechanization on the number of working days required for cutting and hauling has not yet been very great. The ratios may however become different in the near future.

Most work is paid by piece rate, as the following figures for 1957 indicate.

Ratio of piece work to total working days, per cent:

Labourers on foot	76.8
Horsemen	95.1
Truckmen	93.7
Women	1.9

In 1958, grown-up men doing piece work earned 187 Fmk per hour and the horsemen 388 Fmk per hour. Owing to inflation the hourly wages have gone up. In fact, their real value has also risen. Thus, the real piece wage of the labourer has risen 1.8 -fold from 1935 to 1957. — In North Finland wages have always been higher than in the south.

A considerable part of the labour force of the Forest Service consists of farmers or members of their families. For this reason it is significant that forest work reaches its peak at the same time of the year as agricultural work is in its slackest, and vice versa.

Housing conditions for forest labourers used to be very inadequate. A law for controlling the conditions of living quarters in logging camps, enacted in 1928, brought about a considerable change. According to this

law, reasonable dwellings must be built for workers if logging is carried on in localities where adequate housing is not available. — At present, the Forest Service has 900 logging camps at its disposal; about 35 000 men and 10 000 horses can be housed in them. Housekeepers, some of whom have attended a special course, attend to the cooking. During the war the maintenance of logging camps subjected the Forest Service to a severe test.

The number of accidents in forestry and timber floating increased rapidly during the 1920s. Considerable sums were paid out in compensation. In spite of counter-measures and organized courses in prevention, the number of accidents has been rising constantly. In 1954, for instance, the number of workdays lost was 42 459, i. e. 1.3 per cent of the total number of workdays. The corresponding figures in 1958 were 96 485 and 2.9 per cent.

In accordance with its welfare regulations of 1947, the Forest Service has paid attention to the health of its workers. They are entitled to free medical care during their working contract and to wages during the time of illness. Costs due to illness, however, have been small in comparison with those caused by accidents.

Particularly since the war, the Forest Service has also been organizing voluntary welfare. Mattresses and pillow cases, radios, newspapers, equipment for sports and indoor games, etc. have all been provided.

V Education in Forestry and Promotion of the Profession

The highest education in forestry with the view to training forestry graduates began in 1862 at the Forest College of Evo, situated in a thickly wooded area 110 km north of Helsinki. The College was formally subordinated to the Forest Service. The Institute was very important for State forestry. Men trained there gradually assumed the administration of State forests. Only in recent years have the last foresters trained at Evo retired from active duty, though the College of Evo was closed down in 1908, when its functions were transferred to the University of Helsinki.

In spite of this change, Evo has not lost its significance to the Forest Service. The first school in the country to train forest foremen was started at Evo and is still functioning effectively. This school was established in 1876 by Dr. A. G. Blomqvist, the distinguished head of the College of Evo. It was a long time before other similar schools appeared. It was not until the beginning of the present century that State forestry developed to such a stage as to require trained forest foremen — or forest technicians as they were later called.

It was Mr. Hannikainen, the Chief Director, who deserved merit for the subsequent rapid founding of new schools (as many as four in 1903—08). Three of these schools gave 2-year forestry courses, as did the original one at Evo. The last school to be established, in which instruction took place in Swedish, ran 1-year courses for a long time, but now it, too, gives 2-year courses.

It was a long time after that before more schools were needed. The sixth was opened in 1937. The buildings for a seventh were on the point of completion when the area had to be ceded to Russia. And, finally, the newest school was opened in 1961.

All above schools are State-owned and come under the Forest Service. They are situated in different parts of the country; the northernmost lies near the arctic sircle, while the southernmost is on the shore of the Gulf of Finland. Most schools take 40 pupils at a time.

They all have similar curriculums. About one half of the teaching-time is spent on theoretical instruction, and one half on practical training. Tuition is free and the pupils live on the school premises, receiving living quarters, lighting and heating free of charge. In addition, the pupils receive a daily allowance as compensation for their work, 110—140 Fmk per day in 1958. Moreover, the school pays the wages of the household staff. There have always been many applicants to these schools. The selection of pupils in based on theoretical and practical entrance examinations. The age limit is 18—30 years.

The teaching staff of a forest school consists of a director, a teacher and a forest technician. The director and teacher are graduate foresters. The former is also responsible for the school forest district. The areas of these forest districts vary between 7 310 — 55 146 ha. One of the schools functions as a normal school, its additional task being to train young forestry graduates as forest-school teachers.

Under the present regulations the forest schools give the following theoretical instruction: silviculture 100 hours, mensuration and forest management 80 h., supervision of work 60 h., soil science 30 h., peat land studies 20 h., forest botany 50 h., forest protection 20 h., game and fisheries management 30 h., agriculture 20 h., land surveying 40 h., motorpowered equipment 40 h., road construction 40 h., home-building studies 20 h., timber trade 50 h., jurisprudence 40 h., sociology 20 h., bookkeeping 40 h., physics and chemistry 40 h., mother tongue, essay writing and public speaking 60 h., mathematics 100 h.

By the end of 1959, 5 268 forest technicians had been trained at the State forest schools.

In addition to the State forest schools, forest technicians are trained by a 2-year forest school, run by a private company, and also by the technicians-section of the sawmill school. The latter school is supported by the State. The number of technicians trained by these schools is small.

The Forest Service has always attended to the extension training of forest officers and technicians. The courses of logging techniques are especially noteworthy. These have been organized by the logging Techniques Office, established by the Forest Service in 1955.

Other means adopted by the Forest Service to promote the forestry profession include the following:

In 1952, a movement was started to encourage initiative. Many worthy ideas have cropped up, and the aim — to keep minds alert — has been achieved.

The professional organization of the officials of the Forest service

has not, of course, been created by the Forest Service, but it has always been encouraged and its beneficial influence has been appreciated.

The great variety of publications issued by the Forest Service has helped to keep its personnel up to date. "Metsähallituksen tiedonantolehti" (The Forest Service News Sheet), founded in 1954, deserves special mention. Another notable publication is "Metsähallituksen teknillisiä tiedoituksia" (Technical Bulletin of the Forest Service), which has been issued as required since 1957.

VI Work for the Promotion of Private Forestry

Under the regulations of 1859 the supervision of private forests was part of the duties of the Forest Service. In addition, it was stipulated that the State should exercise a positive influence on private forestry by setting a good example.

Starting the Forest College of Evo in 1862 and the first school for training forest foremen in 1876 were important milestones in the promotion of private forestry.

In fact, during the early years, most of the graduates of the lower school entered private employment.

The appointment of two forestry advisers in 1878 was at least of symbolic significance. They were well known silviculturalists and they brought about some improvement in the treatment of the forests of certain large farms, mills and cities. Their work, however, was but a drop in the sea. The appointments were discontinued in 1906 and 1919.

In 1917, a law was passed for the prevention of forest devastation. The provincial forest committees and their personnel, appointed in accordance with the law, set to work straightaway. The highest official was the provincial forest inspector, who was a graduate forest officer and was appointed by the Forest Service. The Forest Service was also responsible for the supervision of these committees and their officials. Since the law of 1917 burdened the Forest Service with considerable responsibility as regards private forestry, the office of Chief Inspector of Private Forests was established in the Forest Service in 1917.

A new, more effective Forest Act was passed in 1928. Its enforcement and supervision, too, was more effective. The eight provincial forest committees were replaced by 18 district forestry boards and two central forestry associations were founded to supervise their work. The Forest Service was to supervise the activity of the forestry boards and to guide and advise the central forestry associations in their work.

In point of fact, the central forestry associations and their forestry boards act quite independently; the control exerted by the Forest Service upon them has been mainly of a formal nature.

On the other hand, the Forest Improvement Act, enforced in 1929, gave the Forest Service a great deal of work, especially in matters of direct benefit to private forestry. It became the task of the Forest Service, for instance, to grant loans and subsidies and examine their guarantees. In addition to the office work, the realization of plans has been supervised in the field. In 1930—59, 9 405 forest improvement plans were approved.

When considering the benefits brought by the Forest Service to private forestry, the State forestry schools, which number seven at present, should not be forgotten. Private forestry could hardly have achieved its present level if it had not received forest technicians trained in the Forest Service's schools.

The Forest Service has played an important role in the management and supervision of jointly-owned forests, though the bulk of these forests has been transferred to the administration of the district forestry boards. The Forest Service worked for the benefit of these forests mainly in 1908—59. The total area of jointly-owned forests today is about 354 000 ha.

Forests belonging to ecclesiastical estates were for a time administered by the Forest Service. As early as in 1892, certain branches of the Forest Service were given the task of drawing up management plans for the forests on these holdings, which then numbered 670. Data on their areas became available only when the management plans were completed. By 1938 the number of ecclesiastical estates had grown on account of the fact that the estates of the Orthodox Church had been included, among other reasons. The total area, according to the national forest inventories, was 334 000 ha. in 1922, 296 000 ha. in 1938 and 158 000 ha. in 1951. Since 1951 the acquisition of land for settlement has further decreased the area considerably.

The ecclesiastical forests were of a good site quality as is revealed by the following comparison based on the second national forest inventory (1936—38):

	Better than average	Average	Poorer than average
	Percentages of total productive forest area		
Ecclesiastical forests	55.2	27.6	17.2
Private forests	51.6	25.7	22.7
State forests	16.9	16.7	66.4

In mean volume, too, ecclesiastical forests were better than private and State ones.

State-employed forest officers under the Forest Service were already managing the ecclesiastical forests in the last century. The numbers of these foresters were increased according to need; in 1918, for instance, they numbered 13. In addition, there was an introducer in the Forest Service, who was put in charge of his own section in 1921.

The ecclesiastical forests thrived under the supervision of the Forest Service and provided parishes with large revenues. In 1923, for instance, 414 200 large timber-trees and 62 600 cu. m. of piled cordwood were marked in these forests. In 1938, after their area had decreased because of land settlement, the corresponding figures were 207 000 large timber-trees and 243 000 cu. m. piled measure of cordwood.

War, cessions of territory and land settlement have had a paralysing effect on the work done on behalf of these valuable forests. In 1954, all the posts held by foresters in the ecclesiastical holdings were abolished, as, too, was the position of Section Chief in question. The work of the Forest Service on behalf of the ecclesiastical forests came to an end after almost 60 years of fruitful activity. The forests were transferred to the supervision and management of the parishes. Only holdings of the Orthodox communions, about 2 000 ha., remained under the supervision of the Forest Service.

Another activity of the Forest Service of benefit to private forests is the organizing of courses for forest owners, their sons, primary-school boys, and others. These have been run from time to time at the State forest schools.

One example of the activities of the Forest Service outside the sphere of State forestry: since the 1930s it has been incumbent on it to supervise the export of lichen and red whortleberries.

VII Promotion of Forest Research

This began as early as 1867 when A. G. BLOMQVIST, the senior teacher at the Forest College of Evo, received an order from the Forest Service to set out on extensive trips around the country and gather material for the compilation of yield tables. The order was issued by R. WREDE, the then Chief of the Forest Service, which is to be counted to his credit.

Later chiefs of the Forest Service have also given similar orders to young scientists, who thus have had the opportunity to gather material for their studies.

Side by side with their practical work, the men of the Forest Service have carried out a number of experiments and surveys, and have provided scientists with reliable notes on many operations in the forests.

Such experiments and surveys have been carried out for instance in the fields of silviculture, mensuration, logging operations, the housing of forest workers, the construction of roads and floating channels, and the management of fisheries.