THE DEVELOPMENT OF SUSTAINED-YIELD FORESTRY IN GERMANY

By

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Approved:

[Blurred name]
Professor of Forestry
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<table>
<thead>
<tr>
<th>Chapter</th>
<th>INTRODUCTION</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>HISTORICAL BACKGROUND</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Effects of Early Devastation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Map 1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Silvicultural Progress</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Map 2</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Exotic Species</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Cutting Practices</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Area-Allotment Method</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Map 3</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Volume Methods</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Formula Methods</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Effect of the Industrial Revolution</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Map 4</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Recent Trends in Silviculture</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Table I</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II</th>
<th>FORESTRY EDUCATION IN GERMANY</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Education before 1750</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>The Master Schools</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>State Forestry Schools and Their Importance</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>1. Dresden-Tharandt</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>2. Eberswalde</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>3. Giessen</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>4. Munich</td>
<td>24</td>
</tr>
<tr>
<td>Chapter</td>
<td>OWNERSHIP OF THE GERMAN FORESTS AND THE EFFECT OF GOVERNMENT REGULATION ON MANAGEMENT PRACTICES</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>III</td>
<td>The State Forests</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Communal Forests</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Private Forests</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>1. Large Private Forests</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>2. Medium-Sized Private Forests</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>3. Small Farm Forests</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>State Restrictions on Management</td>
<td>37</td>
</tr>
<tr>
<td>IV</td>
<td>RECENT TRENDS IN GERMAN FORESTRY</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>The Effect of World War II</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Post-War Plans for Forestry</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>BIBLIOGRAPHY</td>
<td>46</td>
</tr>
</tbody>
</table>
INTRODUCTION

Germany is the mother country of Forestry Science. Here forestry was an established profession, and sustained-yield management was the rule, at a time when much of the United States was a wilderness. It was in Germany that the problems of forest management were first treated on a scientific basis, and the whole world has benefitted from the work of the scientists who pioneered in this field.

Few students of Forestry in the United States realize the tremendous effect German methods have had on the development of Forestry in America. Aside from a few formulae found in text books and general references to "European methods", forestry students accept their profession as the development of an American science. The purpose of this paper then, is to bring forth some of the more interesting facts concerning the development of German forestry in order to show, in part at least, the leading position that country has held in the field of technical forestry.
CHAPTER I
HISTORICAL BACKGROUND

Effects of Early Devastation:

Forestry and forest management as practiced in Germany today is the result of centuries of effort and endless experiments to develop a forest economy which would supply the needs of a constantly growing population and still maintain adequate reserves and a continuous reproductive potential. Many of the experiments were without scientific foundation, and forest practices were quite often designed for exploitation rather than good forest management. Present day forests still bear the scars of mis-use, and their composition and character clearly reflect the beliefs and practices of the foresters of the other generations.

Aside from the changing doctrines of forest management, a great many factors have directly and indirectly influenced the development of forestry down through the years. Of primary importance among the many forces which pushed Germany toward a program of managed forestry was a growing wood shortage and the fear of a wood famine. As early as the twelfth and thirteenth centuries, the land in western Germany had been cleared until further reduction of the forested areas was deemed undesirable. Accordingly, for the first time, decrees forbidding land clearing were issued in the Rhine region of Germany and Austria. From this early beginning has developed one of the most complex sets of forestry laws known to man; laws which provide for public control in every phase of forestry down to the smallest detail of operation.

Of major consequence also, was the rapid population growth of the nation between the tenth and fourteenth centuries. Besides the
serious problem of over-cutting which accompanied this growth, other mal-practices had serious effects on the forests, especially those near population centers. Over-grazing by sheep, cattle, horses and swine was a common practice. Indiscriminate cutting of fuel wood, cutting of branches and shoots for weaving, and the use of forest litter to enrich cultivated lands all contributed to the gradual deterioration of the residual stands. Charcoal burning and the potash and glass industries gnawed great gashes deep into the forests.  

The many wars which have plagued Germany for the last thousand years had a devastating effect upon her forests. During each conflict regulated cutting plans were relaxed or discarded in order to furnish the immediate needs of war. The period of reconstruction following each was marked by general confusion and the failure of officials to re-establish proper enforcement of the regulations. Invading armies paid no heed to cutting cycles or management plans. The wood necessary for current operations was cut where it was most convenient. War indemnities and tribute were paid by a destructive over-cutting of the most valuable forests. The oak forests of western Germany especially were plundered in order to sell ship timbers. During these periods fires, which had always been the scourge of the forests, became more plentiful and more destructive.

On the other side of the ledger, several agencies worked purposely or by chance toward the conservation of the forests and the establishment of beneficial forest practices. Chief among these was the passion of the nobility for hunting. Many a forest was saved from destruction not by a desire to save the trees, but because of the wish to preserve a hunting ground for the landowners and the royal huntsmen. Forest Apiculture was also an industry of major proportions and gave a high value to many forests. Until the close of the middle ages, honey was used for sweetening
and the making of mead (a fermented, sweet drink), and the wax was used for making tapers, particularly for church use. The apiarists formed associations with their own courts of justice and special privileges. Trees valuable for honey such as linden and willow were not allowed to be cut. The "Wax Tax" of the apiarists was a common form of payment to ecclesiastical lords by settlers in the forests belonging to churches and monastaries. Frequently forest taxes and other demands made by the landowners were paid with honey.⁶

As the present day pattern of land ownership began to develop, with state-owned lands and communal forests becoming more numerous, certain doctrines of forest management became established and were applied with substantial or little success in various parts of Germany. Although at first no attention was paid to the crude selective cutting and only theft of wood already cut was punished, the other kinds of forest use were more or less carefully regulated. For example, here and there, the number of stock permitted in the forest was limited to those which the permittee could feed over winter with his own fodder. Distinctions were made between sheep and goat pasturage on the one hand, and cattle and horses on the other; the former was occasionally restricted or forbidden. Often the grazing of sheep was a privilege reserved for the landed baron or the feudal lord.
By the fifteenth century a fairly large area of forested land had come under the control of various German cities and states, and public control of cutting and grazing practices was generally accepted in these areas. It is notable that some of the practices introduced by these German cities over five hundred years ago are followed in the standard procedure of forest management today. Instructions for dense sowing so that young trees would have clear stems have come down from that period. About the same time it was discovered that conifers could be easily reproduced over large areas, and this led to the introduction of the clear-cutting system with reserves of single trees or groups of seed trees.

By the end of the middle ages (1450), regular coppice and coppice-with-standards had replaced the unregulated selective cuttings in the broad leaf forests of Germany, and these systems remained dominant until the middle of the eighteenth century. It was in these sprout forests that the first area methods of yield regulation developed. As early as 1359 the city forest of Erfurt was divided into as many annual cutting areas as there were years in the rotation and one such area was cut each year. The number of standards to be reserved in standards-with-coppice forest was exactly fixed in order to insure sustained production of construction timbers. Similar regulation of yield on the basis of area was carried out by a few other cities during the same period.

Logging practices had reached a high stage of development before the thirty years war (1618-1648). More accurate measurement of wood was practiced everywhere. Directions for orderly and economical timber cutting and for accurate sorting of the products were issued in many places. The axe, which had been used exclusively in hewing construction timbers, made way for the more economical saw. By the end of the fourteenth and the start of the fifteenth century, the first water-
driven sawmills appeared in the Austrian and Baravian Alps and in the Black Forest. Transportation of the timber by river driving and rafting dates from antiquity, perhaps even back to Roman days. The use of splash dams in the high mountain regions of the Alps is mentioned in the documents of the fifteenth century. Even the use of earth slides and snow chutes for getting timber down steep slopes to the valleys was well developed by this time. 

Throughout its history the forest economy has been closely related to the general economy of the German State; changes in government or in general conditions has meant a change in the application of forestry. Before the nineteenth century, the keynote of all German life was self-sufficiency of the local unit. This applied not only to the provinces and cities, but to the smallest villages and even to the individual family. The terrible lack of roads, and communication facilities made it mandatory that all needs of the people be supplied from sources near at hand. In some areas this system of self-sufficiency imposed a heavy burden upon the available woods, resulting in strict regulation of the cutting of trees and close supervision over other uses of the forests.

At first, various measures were tried, all aimed at the regulation of cutting so that the forest would always produce an equal annual yield. Eventually the theory of the ideal forest was worked out scientifically under the name of "normal forest". The term, normal forest, is very characteristic, because the need for sustained production was the normal thing in the whole economic life of those times.

In spite of the regulated cutting in the areas faced with a wood shortage, unregulated selective cutting was still the common practice over large areas, particularly during the period following the Thirty Years War. The greatest force yet to combat this practice came in the
form of the rulers of the period from the seventeenth to the nineteenth century. With the development of political absolutism they took it upon themselves to control the forests. They claimed supervisory right over all forests of their domains, with the right to make and enforce police regulations and to exercise judicial power in forest matters. In carrying out this right, "Forest Ordinances" were devised and applied to all forests, irrespective of ownership. These ordinances comprised rules for the proper handling of the woods, and embraced even as late as 1700 the entire forestry knowledge of the time. The most important provisions of these numerous laws were:

1. Renewed and intensified prohibition of land clearing and of forest destruction especially the cutting and damaging of young, thrifty stands.
2. Requirements for reforestation.
3. Rules for orderly felling and hauling of timber from the woods.
4. Restrictions on working up the timber that was felled.
5. Restrictions on the timber trade and provision for free use of fuel-wood and other timber needed by the subjects.
6. Rules forbidding the waste of wood and regulating such injurious minor uses as goat-grazing, turpentining, potash burning, and litter raking.

Silvicultural Progress:

With the application of forest ordinances, and the accompanying growth of interest in forest management, there developed quite naturally a fund of knowledge and a series of experiments along silvicultural lines. Although earlier forestry knew regulated coppice and coppice-with-standards in the broad leaf forests and clear-cutting with reserved
seed-trees in conifer forests, it wasn't until late in the seventeenth century that these systems were widely adopted. About 1700, the system of seed-tree cuttings which had been tried out with conifers was applied also to broadleaf forests, thereby introducing a second form of regulated broadleaf management. This, under G. S. Hartig*, developed into the orthodox high-forest** management of beech, the so-called shelterwood system. Although this system was originally intended for beech only, it was applied mechanically to nearly all species, often with poor results. Failure to get natural reproduction by this method, especially in the pine regions, and the severe windfall damage caused in spruce forests managed under it, caused foresters to turn away from the shelterwood system. Since about 1840 clear-cutting with artificial regeneration has been the general practice in pine and spruce forests.2

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* G. S. Hartig (1764-1837), organizer of the Prussian State Forest Service, founder of scientific silviculture, and co-founder of forestry science in general. One of the outstanding foresters of all time.

** "High Forest" refers to trees or stands grown from seed as distinguished from Coppice Forests.
NATURAL FOREST REGIONS OF GERMANY

1 Northwest German Heath Region
2 Western Baltic Beech Region
3 Broadleaf & Scotch Pine Region of Pomerania
4 Spruce Forest Region of Eastern Prussia
5A North German Pine Region
5B North German Pine (without Beech) Region
6 Pine-Spruce-Fir Region of Upper Silesia
7A Hercynian Spruce-Fir-Beech Region
7B Spruce-Fir-Beech Forests of Alpine Foothills
7C Southwest German Fir-Spruce Beech Region
8 Pine-Oak Region of Upper Palatine & Middle Franconia
9 Alpine Spruce Forest
10A Broadleaf Region of Swabian & Franconian Jura
10B Broadleaf Region of Swabian & Bavarian Plateau
11A Broadleaf High-Forest of Western Germany
11B Broadleaf Coppice Forests of Western Germany
12 Oak Region of the Lower Rhine & Westphalia
13 Pine-Broadleaf Region of the Rhine Valley
15 Chernozem Region
Exotic Species:

Toward the end of the eighteenth century, the cultivation of exotic species of trees aroused much interest in Germany, for the introduction of rapidly growing species promised a means of quickly restocking devastated and open portions of the forest. German troops who had fought in the American Revolution brought home the knowledge of many fast-growing exotics and extensive plantations were begun. The biology of these foreign species and their climatic and soil requirements were not known however, and only three species, *Pinus strobus*, *Quercus borealis*, and *Fraxinus Americana*, have survived. Since 1880, with better knowledge of botany and plant ecology, more successful attempts have been made to introduce numerous species of trees, especially those from North America and Japan.

Cutting Practices:

No other measures had as much influence on the development of a system of sustained yield forestry in Germany as did those regulating the cut. These measures, which began to be applied in the latter half of the eighteenth century, impressed on the German forest its characteristic sustained yield structure. In order to insure a continuous timber supply, it wasn't enough just to attempt to regenerate the stands and afforest the openings. Instead the forest enterprise as a whole had to be systematically controlled from the standpoint of sustained yield.

This required two things; first, limitation of the cut to an amount equalling the growth, and second, introduction of a permanent arrangement and structure of the forest that automatically allowed an equal quantity of merchantable timber to be harvested each year. Such a system of forest management, dominated by the sustained yield principle, was begun in most of the large forests, both state and privately owned, during the first half of the nineteenth century. This system has been
consistently followed to the present day, although methods and procedures have varied widely.

**Area-Allotment Method:**

Of the three most common methods of allotting the cut on a sustained yield basis, the oldest is the age-class or area-allotment method. Here the forest was divided into as many single parts as there were years in the rotation, and each year only one area was cut, this being immediately reforested. Assuming that this system was carried through to the end of a rotation, the forest would then consist of a series of even-aged cutting areas in which all age classes from one-year old to mature trees would be present. This schematic method, with various modifications became practically a standard method early in the eighteenth century.

This artificial arrangement could be successfully applied only in coppice forests, however. It would not work in the conifers where the rotation was much longer, and susceptibility to destruction of part of a stand by disease was greater. The common practice here was to divide the rotation into shorter periods of about twenty years, and to assign to each of these periods an equal cutting area. Attention was paid not only to the size of the area, but the sequence of cuttings so that they proceeded in an opposite direction to that of the prevailing winds. In this way, cutting series developed in which the younger compartment adjoining an older one extended toward the direction from which the prevailing winds came. Although this system was later modified by reducing the size of the unit to be cut and paying attention to local soil conditions, it has nevertheless maintained in forests so managed, the inflexible sustained yield structure of a checkerboard arrangement of graduated age classes.
Forest District Colditz
The Ideal Scheme

- Non-forest Land
- 21-40yr. Conifers
- Broadleaf Coppice
- 41-60yr. Conifers
- 1-20yr. Conifers
- 61-80yr. Conifers
Volume Methods:

Besides the methods of regulating the yield by area, the volume methods early achieved importance. At first, in the sixteenth and seventeenth centuries, a rough estimate of the volume of standing mature timber, and of the expected increment was deemed a sufficient basis for fixing the annual cut. This assured sustained yield in a crude way. Later, in the eighteenth and nineteenth centuries, the methods were much improved. The volume of the standing timber was figured, and the increment, both on the older stands and on the new stands which would replace the timber cut, were carefully computed. The volumes thus computed were then allotted evenly to each year or each period of the rotation. Since only the total limit of the cut was set, and not its location, this method did not result in the characteristic age-class arrangement of the sustained yield forest.¹

Formula Methods:

The third system developed for controlling the annual or periodic cuttings originated at the end of the eighteenth and beginning of the nineteenth centuries. Known as the formula methods or normal growing stock methods, this system was first used in 1788 in conjunction with the adoption of a land tax.² This tax, incidentally, was one of the first devised for forest taxation to be based upon the yield. The basic conception was that a forest managed for a sustained yield must have a normal timber stand which must be maintained as capital stock. Only the increment could be used, just like the interest on money capital. By various methods the amount of normal growing stock was determined and compared with the growing stock actually present in the forest. This was brought to equality with the normal stock either by reducing the cut in case of a deficit, or by increasing it in case of a surplus.
The normal increment was then taken as the allowable sustained cut. The normal growing stock methods were often used, and aided materially in developing the theory of sustained yield forest management.

**Effect of the Industrial Revolution:**

About the middle of the nineteenth century Germany began to feel the impact of the industrial revolution, and in the field of forestry and land use some of the effects were far-reaching. First in importance, was the rapid development of means of communication. Within a few decades, a network of roads, railroads, and inland waterways broke down the many customs and boundaries and turned all of Germany into a single market.

Because of this rapid development, wood became a transportable commodity. Local communities were no longer dependent upon timber produced in the immediate vicinity. The strict, sustained yield management of the single small forest unit was no longer essential. Instead, emphasis was placed on the profit earning capacity of the forest. Wood was changed from a carefully rationed, essential item to an ordinary commodity, the production of which was governed largely by financial considerations.

Next to the development of means of communication, the substitution of coal for firewood had the greatest influence on the use of forest land in Germany during the nineteenth century. As coal displaced wood on the fuel market, the coppice forests which were highly valuable for the production of firewood lost their place of importance. At the same time, however, the demand for construction timbers grew steadily as new marketing possibilities were discovered. The consequence of this development was a complete reversal of the objective of German forest management from the production of fuelwood to the production of industrial timber. In 1850 only 20 to 30 percent of the wood
produced was industrial timber while fuelwood accounted for 70 to 80 percent. By 1913 the ratio was reversed.

As the idea of growing only "money trees" spread, many species that had been valuable for fuelwood were pushed into the background. Beech, for instance, lost a great deal of ground, while pine and spruce gained. Unfortunately, broadleaf and mixed broadleaf-conifer stands were replaced by pure stands of these supposedly more valuable trees in many parts of Germany. No doubt there was an initial increase in the money income. But German foresters came to realize that even-aged plantations of a single species did not always return the long-term profits expected. Sooner or later serious defects appeared such as soil deterioration, decreased rate of growth, lessened resistance to animal and plant parasites, and increased susceptibility to damage from snow, frost and wind. It is now evident that it was a mistake to disturb the natural laws of science, and the trend in recent years has been to replace pure stands with valuable broadleaf trees where suitable, or with mixed broadleaf-conifer stands.
Distribution of Forests in Germany

Ratio Forest to Total Land Area
- Less than 5%
- 5% - 25%
- 26% - 45%
- More than 45%
Recent Trends in Silviculture:

The "change back to a normal forest", school of thought began to gain headway in the last quarter of the nineteenth century. This school headed by Karl Geyer*, demanded that the forest be treated in accordance with biological laws, called for mixed forest instead of schematic culture of pure stands; retention of soil improving broadleaf species, especially beech; natural regeneration instead of clear-cutting with artificial seeding or planting; and uneven-aged form of forest in place of the forest composed of schematically arranged even-aged stands. Of all modern writers on silviculture, Karl Geyer exerted the greatest influence on the practicing foresters of Germany, because he combined thorough practical experience with wide knowledge and an unexcelled capacity for observing nature. His slogan "Back to Nature," has given rise in the last few decades to one of the most promising developments in German Forestry.

Closely connected with Karl Geyer's "Back to Nature" movement, a second doctrine under the name of Dauerwald (Continuous forest) has gained world wide recognition in professional circles. This doctrine recognizes the fact that the forest is not merely an aggregation of individual trees, but is an intergrated, organic community, comprising all the innumerable living organisms that exist, from the smallest soil microbe that clings to the roots of a seedling to the crown of the oldest tree. It is realized that health of the forest and lasting maximum production of timber are possible only if all parts of the forest community function without hindrance or disruption.  

*Johann Christian Karl Geyer (1822-1907) noted professor of silviculture at Munich.
The most serious disturbance of the natural harmony of the forest comes from clear-cutting and the consequent radical changes in the conditions of such things as light intensity, temperature and moisture. The Dauerwald doctrine, therefore, advocates, not clear-cutting, but a single tree selection cutting, done in such a manner "that the forest hardly notices it". In this way the best individual stems can be selected for final harvest. If the poorest trees are taken at each cutting, finally only the best ones remain. The growing stock, even though its volume is no greater, is substantially improved in quality by this process. The annual increment, formerly distributed over all trees good and bad, will eventually be concentrated on the best ones.²

Both the doctrine of "Dauerwald", and the teachings of Karl Geyer have resulted in a closer study of the problem of tree races. German Forestry scientists have achieved notable results in this field especially in the case of pine. Research in this direction is proceeding actively with other species also. This knowledge is not merely for theoretical application, but has been put to practical use in the form of national and state laws covering such phases of forestry as regulating the certification of seed supplies, control of sources of seed and requiring the elimination of inferior species and species especially subject to disease from the forest.
### REGIONAL DISTRIBUTION OF PRINCIPAL TREE SPECIES IN GERMANY IN PERCENTAGE OF TOTAL FOREST AREA

<table>
<thead>
<tr>
<th>State</th>
<th>Hardwood Broadleaf</th>
<th>Total Broadleaf</th>
<th>Spruce</th>
<th>Fir</th>
<th>Total Conifers</th>
<th>Conifer Forest Ards</th>
<th>Silvicultural Form</th>
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<tr>
<td></td>
<td>Oak</td>
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<td>Birch</td>
<td>Coppice</td>
<td>leaf</td>
<td>Spruce</td>
<td>Fir</td>
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<td>12.2</td>
<td>3.1</td>
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<td>29.6</td>
<td>54.5</td>
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<td>2.5</td>
<td>16.4</td>
<td>47.9</td>
<td>43.1</td>
<td>8.6</td>
</tr>
<tr>
<td>Others</td>
<td>14.0</td>
<td>26.1</td>
<td>1.6</td>
<td>3.0</td>
<td>41.7</td>
<td>37.7</td>
<td>17.1</td>
</tr>
<tr>
<td>The Reich</td>
<td>5.2</td>
<td>13.2</td>
<td>2.4</td>
<td>8.0</td>
<td>28.8</td>
<td>43.6</td>
<td>27.0</td>
</tr>
</tbody>
</table>
CHAPTER II
FORESTRY EDUCATION IN GERMANY

Of considerable importance in the development of Forestry Education in Central Europe, and in fact throughout the world, has been the part played by the forestry schools of Germany and the men who taught in them. Many of the standards accepted by foresters of today originated in the German schools where they were introduced, tested, and proven during the period when the theory of forestry science was being introduced.

Education before 1750:

In spite of the long history of forest controls, some of which date back to the days of the Romans, forestry science, as the term is recognized today, is of fairly recent origin. Before 1750, there was no such thing as a technical education in forestry. Interest centered on hunting and the instruction of the young forester was entirely directed toward training a good huntsman. During a two or three year period of apprenticeship the student was instructed in gunnery, learned about the organization of large-scale hunting with nets, other methods of hunting, the preparation of hunting nets, the correct handling of dogs, the blowing of hunting horns, etc. In addition, during the first year he was required to render his master various personal services such as cleaning and saddling his horse, and preparing his hunting equipment.

Under such a system of apprenticeship, it is obvious that forestry education played a very minor role in the life of an apprentice. About the only information to be gained was secured by questioning woodchoppers and charcoal burners, and by personal observation. Fortunate indeed was the student whose master took the time to pass along knowledge of forestry
gained by personal experience or the teaching of others. After completing his period of apprenticeship, the student was released, given a certificate of completion, and sent on his way in search of a position.

The Master Schools:

Between 1750 and 1800, training in forestry was greatly improved upon by the establishment of the master schools, the real beginnings of the forestry schools which were to come later. A few especially capable masters gathered large numbers of students about them who were interested in learning about forestry, and in time forestry was freed from domination by hunting, and assumed an importance of its own.

Though it is true enough that the master schools inevitably reflected the personality and personal experience of only one man, nevertheless these schools emphasized the study of forestry as a science, and were a great improvement over previous methods of education. Unfortunately, many of the schools passed out of existence with the death of their founder. But as the importance of forestry increased, some master schools added staff members and broadened their scope by a more thorough teaching of the foundations of forestry. By 1800, several of these schools had become firmly established on a permanent basis. In addition, at this time lectures in forestry science were being held at some universities for high forest officials.1

State Forestry Schools and Their Importance:

Besides the private master schools, there was state instruction in forestry before the nineteenth century. As early as 1770 there were lectures in Berlin for applicants to the Prussian forest service. Forestry lectures were also given in the universities to candidates for positions in the state finance departments. But the real acceleration in forestry education came after 1815 when the state forest administra-
tions took over the organization of forestry training. Some of the private schools were dissolved, and others were converted into state institutions. Throughout the nineteenth century there was constant change and revision in the position of the forestry schools, but eventually there evolved the comparatively uniform system of schools which exist throughout Germany today. This uniformity is worthy of note, for it must be remembered that until the time of Bismark, (1870), each State was more or less independent and there was little or no co-operative action on such matters.

Of the half-dozen forestry schools with academic rating under State and National control four are of particular interest. A few of the most significant facts concerning them are listed below.

1. Dresden-Tharandt

The forestry college at Tharandt was developed from the private school founded by Heinrich Cotta* in 1875, and is recognized as the birthplace of scientific forestry. In 1816 it was raised to the rank of a royal academy, making it probably the oldest forest school of academic rank in the world.

2. Eberswalde

The forestry college at Eberswalde was founded in 1821 as a part of the University of Berlin. Next to Tharandt, Eberswalde is the best equipped forestry college in Germany. Connected with the college is a state seed control station and four demonstration forests, two of which are administered by the professors at the school. Among the institutes of the college, that for forest labor problems is believed to be the only

* Heinrich Cotta, (1763-1844), founder of forest organization and co-founder of scientific forestry.
one of its kind. This institute is a scientific center for working out the practical problems of organization and rational use of labor in forest management.

3. Giessen

The forestry institute of the University of Giessen was founded in 1825 and is the oldest forestry school continuously connected with a university. Its location in western Germany makes it a convenient center from which to study the problems of the Rhine Province, and the regions adjacent.

4. Munich

German forestry science owes a great deal to the Institute of Forestry in Munich for pioneer progress in many important phases. It was here that Karl Geyer laid the foundations of modern silviculture. Here also Heinrich Mayr created the first silviculture with a world-wide basis in plant geography.

Many other schools contribute to forestry education in varying degrees. The school at Freiburg lies in the foothills of the Black Forest and affords excellent opportunities for studying the Oak and Fir forests of this area and the problems of selection forests. The Forestry College of Hanover-Minden is located near Kassel in the midst of fine oak and beech forest which greatly facilitates the study of problems in this region of western Germany. These schools, which emphasize the practical application of forestry in the woods, differ from schools such as the one at Munich where the faculty is closely connected with a university, and subjects in all fields are integrated into the curricula. Somewhat different from both of these is the third type represented by the school at Tharandt where the faculty is an independent unit of a polytechnical university. Here the approach to forestry problems lies
pretty much in the field of pure science.

Of the three, it is impossible to say which is best. Many arguments have been put forth in favor of one or another, but in almost all cases they were biased or based on local and personal points of view. The best conclusion is that the variety of academic education in forestry is an advantage, for the problems of forestry are many sided.
CHAPTER III

OWNERSHIP OF THE GERMAN FORESTS AND THE EFFECT OF GOVERNMENT REGULATION ON MANAGEMENT PRACTICES

The division of German forests among the various classes of owners according to the census figures of 1927 is shown in the following table:

<table>
<thead>
<tr>
<th>Class</th>
<th>Acres</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Forests</td>
<td>80,600</td>
<td>0.3</td>
</tr>
<tr>
<td>State Forests</td>
<td>10,128,200</td>
<td>32.4</td>
</tr>
<tr>
<td>Communal Forests</td>
<td>4,857,500</td>
<td>15.5</td>
</tr>
<tr>
<td>Institutional Forests</td>
<td>506,200</td>
<td>1.6</td>
</tr>
<tr>
<td>Association Forests</td>
<td>741,700</td>
<td>2.4</td>
</tr>
<tr>
<td>Entailed (restricted) Private Forests</td>
<td>4,932,500</td>
<td>12.9</td>
</tr>
<tr>
<td>Free Private Forests</td>
<td>10,921,800</td>
<td>34.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>31,188,500</td>
<td>100</td>
</tr>
</tbody>
</table>

From the pattern of ownership shown, it may be readily assumed that the forms of management are equally diversified except where they are controlled by legislation. But the very wide range in forest conditions, which is by no means confined to the conditions of ownership, makes a national law with uniform rules and requirements impractical. Until recently, therefore, national forestry legislation has been in the form of a broad framework, and it has been left to the States to determine the method for fulfilling the purpose of the law.

Thus the major role in forest regulation has been played by the States. State laws limited the annual cut, provided for the re-establishment of denuded areas, punished violators, and set the tax levy to be collected from forest lands. Until the establishment of the Third Reich
in 1933-34 all efforts of the National government to infringe upon the power of the States in forestry matters were successfully resisted.

Since the end of hostilities, most of the Nazi-fostered regulation has been abolished, and forest regulation is once more the responsibility of the various states. However, some of the laws which have contributed to good forest management throughout the country are being kept in force, either by co-operation between the various States or by the Allied Central Control Council.

With forest regulation again under State control, there is every reason to believe that forestry will once more be subject to restrictions similar to those in effect before the rise of Hitler to power. These laws were developed to meet the problems arising from the varied ownership pattern, and they, in turn, have directly affected this ownership and the consequent objectives of forestry management.

For purposes of discussion, forest ownership can be divided into three main groups each with a separate primary management objective. The first group State forests, contains 32.4 percent of the forest area of Germany. The National Forests which contain only 0.3 percent have similar objectives and can be included here. The second group, Communal forests comprise 15.5 percent of the Forest area and Private Forests, the third group, includes 47.8 percent or almost as much as all other types of ownership combined. Association and institutional forests, making up 2.4 percent and 1.6 percent of the total forest area, respectively, are generally managed in the same way as private forests and can be included in this group for discussion.

The State Forests:

Since ancient times there have existed certain "rights of use" in the German forests which permitted the peasants to take from the forest
domain certain materials considered essential to their livelihood. The necessity of these privileges was recognized by all owners, state, feudal lord, and communal alike, and they were continued from one generation to another even though ownerships changed. These rights included mainly: the right to take wood needed for building; rights to fuelwood; use of the forests for grazing; rights to forest litter; and the right to fatten hogs on acorn and beech mast.

Originally these rights were probably beneficial for they at least made some use of the forests. But as the demand for these products increased and wood gained in value, their application began to have a harmful effect on the forests. Their existence hindered the progress of proper cutting practices, prevented natural regeneration of the forest, and contributed to the depletion of the forest soil.

When various States introduced systematic forest management based on working plans in their State forests about 1800, they found the woods in the worst possible condition; mainly as a result of the excessive demands of inhabitants entitled to rights of use. Before proper management plans could be put into action, then, it was necessary to curtail or abolish some of these privileges. Efforts in this direction met with considerable opposition, but over a period of a century State control gained steadily until it has now become almost absolute. Fifty-seven percent of all the German State Forests were freed from these rights of use when they were abolished by law, and those who formerly benefited were reimbursed either by payment of cash or land. On the remaining area where these rights still exist, there has been considerable modification and restriction of them in order to protect the forests.

As a result of the poor condition of the forests, the first plans of the several State forest administrations called for conserva-
tion of the standing timber and the building up of reserves by careful limitation of the annual cut. This practice continued throughout the nineteenth century under the theory that the value of the stands depended upon the total volume and the presence of very old stands. It wasn’t until about 1900 that this belief was replaced with the idea that value should be based, not upon total volume but upon the productive capacity of the forest; that is, on the increment that can be expected over a long period. From yield tables for normally grown stands it appeared that the maximum sustained yield might be increased to two or three times the supposed maximum by increasing the annual cut and liquidating stands of stagnant, over-mature timber. 3

The following table shows how the average annual cut per acre has increased on the State forests of two representative German States since they have been under systematic management - (1829-1919).6

Average Annual Cut Per Acre in the State Forests of Two German States

<table>
<thead>
<tr>
<th>Period</th>
<th>Prussia</th>
<th>Bavaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>cu.ft.</td>
<td>cu.ft.</td>
<td></td>
</tr>
<tr>
<td>1829-1834</td>
<td>25.02</td>
<td>36.46</td>
</tr>
<tr>
<td>1835-1839</td>
<td>21.59</td>
<td>45.76</td>
</tr>
<tr>
<td>1840-1844</td>
<td>30.73</td>
<td>49.33</td>
</tr>
<tr>
<td>1845-1849</td>
<td>31.45</td>
<td>49.90</td>
</tr>
<tr>
<td>1850-1854</td>
<td>21.74</td>
<td>46.33</td>
</tr>
<tr>
<td>1855-1859</td>
<td>27.17</td>
<td>19.05</td>
</tr>
<tr>
<td>1860-1864</td>
<td>28.60</td>
<td>18.05</td>
</tr>
<tr>
<td>1865-1869</td>
<td>28.60</td>
<td>20.06</td>
</tr>
<tr>
<td>1870-1874</td>
<td>31.46</td>
<td>51.19</td>
</tr>
<tr>
<td>1875-1879</td>
<td>33.22</td>
<td>29.93</td>
</tr>
<tr>
<td>1880-1884</td>
<td>36.61</td>
<td>49.33</td>
</tr>
<tr>
<td>1885-1889</td>
<td>40.18</td>
<td>54.34</td>
</tr>
<tr>
<td>1890-1894</td>
<td>44.17</td>
<td>62.92</td>
</tr>
<tr>
<td>1895-1899</td>
<td>42.18</td>
<td>66.78</td>
</tr>
<tr>
<td>1900-1904</td>
<td>50.76</td>
<td>59.63</td>
</tr>
<tr>
<td>1905-1909</td>
<td>53.95</td>
<td>60.92</td>
</tr>
<tr>
<td>1910-1914</td>
<td>64.64</td>
<td>76.36</td>
</tr>
<tr>
<td>1915-1919</td>
<td>-----</td>
<td>68.35</td>
</tr>
</tbody>
</table>
Since the State forests are public property, and their purpose is to serve all the people, the objectives of management are necessarily more numerous than they would be in the case of a private owner. To best attain these objectives certain principles controlling State Forest Management have been set up. They can be summarized as follows:

1. Sustained yield forestry should be the primary purpose of management.

2. Yield capacity is to be maintained for the good of society and increased if possible.

3. A one-sided financial management or management strictly for profit should not be allowed.

4. They should be held as a trust belonging to the nation.

5. They should yield to the present generation as high a return as possible in forest products and "welfare effects," but they should also guarantee equally high returns to future generations.

At least two other considerations have also guided State Forest Administration policy. The first of these is the belief generally accepted by forest officials that the State forests are especially suited, and to some extent obligated to produce large sized timber or other material which takes a long time to mature. The second consideration is in regard to timber sale policy. In order not to disturb the economic position of the private forest owner or the timber merchant, favoritism in setting market prices should be strictly avoided. Therefore, the timber-price policy should be coordinated with the general market condition.

Adherence to these principles has not meant that the forests could not be drawn upon as a means of revenue or relief during times of emergency. During periods of crop failures, they have furnished litter,
leaf fodder and pasturage, and in times of depression the distribution of wood below market price to the needy has been common. Such use of the forest products can certainly be considered as in the realm of service in the public interest. On the other hand, at various times the forests have been drawn upon to raise revenue for purely political purposes by those in power. This over-cutting to serve selfish or political needs has often forced a reduction in the cutting budget to far below that which could be expected in a normal forest.

A contributing factor in this depletion by politicians has undoubtedly been the position of the forest officials in the State government. Originally, all forest officials were attached to the finance department and were subordinate to other finance officials. Being under the control of men unfamiliar with the problems of forestry management meant that practically all controversies in that field were compromised at the expense of the forest. Gradually the division of forestry gained in importance and in the 1920's became independent of other departments. In 1933 the Hitler regime created a "National Forestry Office," but it is doubtful if the freedom of action of forestry officials was increased by the move.\(^3\)

Communal Forests:

The communal forests in Germany perform several important functions and of necessity require a multiple-use plan of management. City forests are valued mainly as places of recreation and watershed protection. In small, poor communities, the forest is of real economic value serving as a source of fuelwood, litter, pasturage, etc., and in times of need, as a source of money revenue. Most of the individual forests are large enough for sustained yield management, and if community members don't interfere can be managed intensively.
The percent of units in each size-class is shown below:

<table>
<thead>
<tr>
<th>Size-class</th>
<th>Percent of total area in Communal forests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 247 acres</td>
<td>14%</td>
</tr>
<tr>
<td>247-1,235 acres</td>
<td>43%</td>
</tr>
<tr>
<td>Over 1,235 acres</td>
<td>40%</td>
</tr>
</tbody>
</table>

The relation between communal forest ownership and sustained yield management is a peculiar one and requires special forms of control and supervision. Of course the community itself is a permanent organization and as such should plan ahead to insure the rights of future generations. But the individuals of the community are often more concerned with current problems, and the possibility of getting forest products cheaply and in large quantities. They almost always favor increased cutting of the forest in place of additional taxes. In areas where the communal forest is legally a "common forest", strict supervision has become necessary to preserve the stand.

In legal terms communal forests are classified as "Common forests," or as "domain property," and the management and conduct of operations varies in accordance with the legal status. In a community forest described by law as a "Common forest," the yield is divided among the privileged members and their interests have priority over the attainment of maximum sustained yields. Obviously this makes any type of forest management difficult. For example simple coppice or coppice-with-standards forests may be kept just because community members have rights to all fuelwood produced in the forest. In some cases construction timbers were cut into firewood for the same reason.

With community members free to help themselves it is easy to understand why this category of ownership showed the greatest forest
mismanagement known in Germany when the States started regulatory measures at the beginning of the nineteenth century. Community forest conditions were so bad in many cases that some States assumed complete control of management and administration through State forest officers. In other States it was required that the working plan be approved by proper State officials, although the community was allowed to employ its own forest officers. Still other States retained only general supervision over community property, solely to see that the forest area was maintained.

State control over community forest properties has been confined mostly to the "common forests". About half of the forests in community ownership are classed as "domain property". Here all income from the forest goes into the general fund, and the influence of individuals in matters of management is considerably reduced. In the absence of this interference, forest managers have been more nearly able to establish forests capable of meeting the multiple-use demands made by the communities they serve.

Private Forests:

German private forests occupy almost as much area as all other types of forest ownership combined, and consequently present the greatest variety of management plans and forms of silviculture. The objectives of management quite often differ considerably from those prescribed for State and Communal properties, and since these objectives are directly affected by the size of the forest unit and the class of ownership, perhaps the variations can best be shown by discussing each class separately.

1. Large Private Forests

The definition of a "large forest," is rather indefinite, but generally it is taken as an area which, under the intensity of management
customary in the locality, requires the full-time services of an academically trained forest officer. Ordinarily, this is an area of about 6,000 acres under intensive management, and 8,600 to 10,000 acres under extensive management. In some cases, where smaller tracts have the operating advantages equal to those of large contiguous forests, areas of 1,000 or 1,250 acres may be independent units of management.

The owners of large forest properties usually regard them as productive capital investments which should return a dependable yearly income, and for the most part they have been managed on this basis. The relatively high safety of the investment, the fairly certain income, the ease of administration with a few employees, and the various social advantages has led to the investment of large fortunes in sustained yield forestry in Germany and all of Central Europe. Their natural resistance to the violent fluctuations of economic conditions caused by political change has also favored the retention of these enterprises.

It has been recognized in the old countries that in the long-run and from a broad viewpoint, all capital investment can yield only a relatively low rate of interest. The high returns of boom years are offset by the low returns or losses in times of depression. Averaged over long periods, money capital yields an interest return scarcely higher than that of sustained yield forestry which in turn approaches the mean of the so-called "natural interest rate", (the rate at which all that is organic grows; the increment of trees, of animals, etc.). Under this philosophy the forest administrator and the forest owner think in terms of rotations, and expect only a natural and unforced rate of interest.

Guided by such a philosophy, it is no wonder that the large forest properties are well managed, even excellently so, in some cases.
The yield per acre is almost as high as that on State forests and the timber is usually of fairly large size. By way of comparison, growth figures compiled just before the war showed that State forests were growing at the rate of 455 bd. ft. per acre, the large holdings at 333 board feet per acre, medium-sized ones at 212 board feet, and small ones at only slightly more than 100 board feet per acre per year.

Contributing in no small measure to the high standards of management in the large private forest, has been the application of the "entail," or of "limited ownership" to hereditary properties. The legal peculiarities of the entail, some of which are shown below, automatically insured sustained-yield management when applied to the forest.

1. Sale of inherited property is prohibited.
2. Division by inheritance is prohibited.
3. Order of inheritance is regulated. (Property usually goes to the eldest son).
4. The incumbent proprietor has possession, control, and the right to dispose of the income as he sees fit.
5. He is obligated to maintain the capital stock unimpaired.
6. The capital stock may not be touched by him or impaired by neglectful management.

Although the many arguments against this law may be politically and economically justified, the well-managed condition of the forests has proven its value in this field. Entailed forests also combine three important advantages which are difficult to obtain in other types of ownership, namely, areas of suitable size, stability and continuity in ownership, and the initiative of private enterprise.
Practically all of the large private forests are entailed. On those which are free, management is affected by the attitude and efficiency of the proprietor.

2. **Medium-Sized Private Forests**

Forest properties of medium-size resemble either the large holdings or the small ones, depending upon the financial strength of the owner, and the conditions which limit the objectives of forest management. They range in size from 2½7 acres to 1,250 acres and for the most part are managed so as to yield a regular yearly income. Excessive cutting in times of strong demand, or damage due to natural causes are far more likely to disrupt the operating plan here than on a larger unit, however, because of the difficulty of balancing the growth factors on a small area. The actual management of these stands is usually left to forest officers of the lower grades, (less than an academic rating), or even to laymen. As a result there is a wide variation in the quality of management here. Along with those which have been well managed are others which have been neglected or overcut.

3. **Small Farm Forests**

The small farm forests of Germany are very similar in character to the farm woodlots of the United States, and many of the forestry problems are the same. Being less than 2½7 acres in size, they are not usually managed for sustained yield, but as a part of a farm to furnish various materials required by the farm establishment. Foremost among the materials needed are fuelwood, litter, pasturage, and building materials.

The small piece of woodland is the farmer's savings bank, a reserve capital which tides him over in time of need and crop failures.
In the poor agricultural areas of Central Germany the small forest is the financial backbone of farm economy. The credit standing of the owner depends upon the composition and condition of his woodlot. If he suddenly sells all of his merchantable timber it is taken as a bad sign and his credit rating declines.

The importance of the woodlot does not lie in timber production, as in the case of large and medium-sized forests, but in the total of all benefits it brings to the farm. Timber production is often quite low because these holdings are customarily on poor soil unsuited to agriculture, but the number of uses to which smaller products can be put is almost limitless. In addition to the utility of its products, the forest furnishes employment for the farmer and his family during the winter when other work is at a standstill. It is this merging of agriculture and forestry interests that adds to the owner's total income and establishes the true importance of the farm forest.

State Restrictions on Management:

Although the regulation of the forests by the State is applied to all ownerships alike, none feels the restrictions more keenly than the private owner. In some measure private management is directly to blame for these restrictions, since most forest laws were originally designed to correct the deplorable management practices carried on by private interests. Public forest administrators realized early the need for systematic management and were able to introduce suitable plans without too much opposition. Their main efforts were expended in resisting the attempts made by short-sighted, selfish politicians and others to disrupt the plans after they were in operation.

The private owners, on the other hand, were not converted to the
philosophy of sustained yield so easily. They readily agreed that sustained yield had many desirable features, but nevertheless opposed it for economic and financial reasons. Their resistance was stubborn, but eventually the poor condition of private forests showed that regulation was mandatory if the forests were to be saved.

Regulatory action taken by the different States, has varied somewhat, being generally stronger in southern and western sections than in northern and eastern ones, but as measured by American standards it was all pretty drastic. The first regulation consisted almost entirely of prohibitive laws passed to conserve the forests and prevent further depletion. Later on legislation of a positive nature designed to re-establish or increase the productivity of the forests came into being. Periods of wartime economy, and changing economic conditions have caused tightening or relaxing of State controls over private forestry, but the long-time trend shows that public control has gained a great deal of ground during the last century and a half.

Some of the regulations in effect throughout most of the German States shortly before the establishment of the Third Reich are listed below. Most of them which do not interfere with Allied operations have been re-established since the end of the war.

1. All forest owners are required to set up a management plan acceptable to State authorities.

2. Forest officers appointed by the State must be employed on those properties requiring the services of a forester. (In some States the owner may be allowed to set-up his own management plan if the State feels that he is qualified.)

3. Land clearing without previous permission is forbidden. (Not in all States.)
4. Inheritance fellings cannot be made to pay off co-heirs.

5. Forest property cannot be divided among heirs, but must be kept intact with one person in full control. (Usually the eldest son retains the property. However, other heirs have certain rights concerning it. All the children have the right to live on the property until they become of age, and are entitled to have the cost of their education provided. Daughters are entitled to a trousseau, and the widow may live there. If through no fault of his own, an heir cannot make a living, he may live on the property if he is willing to work.

6. Any sale of forest property involving more than twelve acres must be approved by public officials. Likewise, any contracts touching on the use of forest products, (stumpage sales, leases, mortgages, etc.), may not be permitted if there is danger of mismanagement or the chance that the economic independence of a unit might be imperiled. If it is felt that the buyer is taking advantage of the needy condition of the owner to make unreasonable stipulations, the contract in such a case might also be voided by public officials.

7. Forests may not be partitioned below a minimum size in several States.

8. If a forest owner goes bankrupt as a result of general economic conditions, a forced sale may be postponed for six months in an effort to prevent sale at ruinous prices.

There are many other general laws which affect forest properties and they range from regulations which fix timber and lumber prices, to those which limit the amount of wildlife allowed to inhabit the forests. The trade laws and the industrial tax laws have had an unusual effect on the operation of sawmills as a part of the forestry enterprise, and on the forest operation as a whole.
In the case of the sawmills, certain tax exemptions are permitted for any mill which cuts only timber produced on the forest which it serves. In other words, a forest owner may build a sawmill to cut his own timber, but if he buys logs on the open market, he is subject to additional industrial taxes. The great majority of sawmills, therefore, are quite small, cutting less than 2,000 board feet per day, and in almost every case they serve other purposes than that of sawing timber.

A typical example of those found throughout central and southern Germany is the sawmill located on the Züschen forest near Fritzlar, Germany. It serves a combined enterprise of agriculture and forestry and has three major functions. First it is the power plant for generating the electricity used by the village of Züschen, and by the estate which it serves. It is in operation twelve months of the year for this purpose. Second, it is the source of power for all the agricultural machines on the estate, from the grain thrasher to the grinding mill. Its greatest use here comes during the period from late summer to mid-winter. And third, it is used as a sawmill during the period when the power generated is not needed for the other machinery.

One man is in complete control of the sawmill. He maintains the power plant and repairs the machinery if necessary. When not occupied with other duties, he operates the sawmill, cutting lumber for use on the estate or for local sale. Besides this work, he puts in a great deal of time in the sawmill workshop for he is a cabinet maker by trade, and it is his duty to repair broken tools and build the many racks, troughs, etc., needed on the estate of the owner.

As can be seen, such multiple use of the sawmill relegates the cutting of lumber to a rather minor role. For this reason, the mill is not a part of forestry, but belongs to the estate as a subordinate
unit dependent on the main economy with lumber merely a by-product. A distillery, brewery, or starch factory connected with an agricultural economy would be classed in the same category. Such subordinate units are not allowed to buy and manufacture any products produced outside the main economy if they are to remain exempt from trade taxes and the industrial property tax.
CHAPTER IV

RECENT TRENDS IN GERMAN FORESTRY

The Effect of World War II:

As far as the forests of Germany are concerned, World War II began in 1933 when the Nazi regime came into power. At that time the Food and Agriculture Division of National Socialist Party moved into the government to replace the established division of forestry, and the whole administrative organization was centralized, the States losing their regulatory powers in the process.

This central control was administered through the office of the National Peasant Leader, who was also Minister of Agriculture. The organization, similar to all units of the Nazi Party, was primarily political, from the top man down to local forest officer. Although forest management was intensified and total production boosted under this system, forestry gained little except in the field of research, and the economic effect was to increase the financial burden borne by the forest enterprise. Perhaps the outstanding fault of this system lay in the attempt to establish and maintain nation-wide control through a single central office. The fallacy of the plan becomes clear when the ratio between laborers and officials is shown. During the years immediately preceding the war, one forest official was employed for every three forest laborers. Obviously the forests could not indefinitely support such top-heavy supervisory costs.

At the time Hitler came into power, it was estimated that the German forests contained 350 billion board feet of timber. In 1935 the German government ordered that the forest be over-cut to the extent of
50 per cent, and this order was kept in effect up to and during the war, although in the last years the program lagged due to a shortage of manpower. The estimated over-cutting during the Nazi regime amounted to some 65 billion board feet, and the growing stock was reduced by about 25 per cent. Through over-cutting and the loss of territory, the volume today is probably about 200 billion board feet.

On top of the over-cutting came military damage during the war estimated for Germany as a whole to be between two and three per cent. Most of this damage is attributed to large forest fires which occurred in the Russian Zone of operations, and to tank and artillery warfare in areas where ground fighting was heavy.

Post-War Plans for Forestry:

In spite of the serious over-cutting, which has been carried on for the last 15 years, present day forests are in excellent condition. The broad effect of this over-cut has been to reduce the reserve of mature timber, and to some extent, the rotation age. In forests which sustained military damage the broken material can be salvaged for fuel-wood during the present acute coal shortage, thus preparing the way for the regeneration of a healthy, undamaged forest. In some cases the great demand for wood has given an opportunity to clean the stands of poor quality trees and inferior species, all of which indicates that the setback incurred by the forests themselves is not so great that it cannot be overcome.

Of more serious consequence, perhaps, has been the loss of many forestry records and the lack of technical personnel to do the work necessary to re-establish and maintain a forestry program. Many of the technical foresters were ardent Nazis, and under allied policy cannot hold public office. As a result, only about half the available positions
have been filled, and many of these are held by old men called back from retirement or young ones who lack proper experience and training.

When the Allied Powers took over management of the German State, in the summer of 1945, the forest economy, like almost everything else, was at a complete standstill even though there was a desperate need for wood by the Allies for military use, and by the civil population to begin the task of reconstruction. It immediately became evident that the great demand for wood must be met to some degree even though it meant a delay in the return to forest management on a sustained yield basis. It was decided, therefore, to cut the forests to meet military and civilian needs for a period of two years without regard to management plans. This two-year period will expire in October, 1947.

During this period a complete survey of forest resources is to be made to determine growth, the volumes by age-classes and size, and other information so as to provide a complete picture. At the same time, management plans will be brought up to date, and those destroyed during the war will be replaced. To alleviate the shortage of trained personnel, the American Military Government has opened three ranger schools and a professional forestry school in the American Zone of Occupation, and it is likely that the other Allied Powers will take similar action in their Zones. After completion of these surveys and consideration of their results, a forest policy will be drawn up for each Zone and coordinated by the Control Council of the occupying powers.

It is still too early to definitely say what the Allied long-term policy will be in Germany. It is fairly certain, however, that any large reserves of mature timber will be liquidated since the Potsdam agreement provides for eliminating war potentials. It is the prediction of Joseph C. Kircher, Chief of Forestry Section, U. S. Military
Government, Germany, that Allied policy will probably provide for shortening timber rotations and for the systematic removal of all timber above the new rotation ages. This would not only prevent the building up of resources which might later be used for war purposes, but might also provide for clearing and using for food crops any present forest areas that are well suited for that purpose. It is realized that it may be desirable to leave some mature stands on longer rotations for the production of high-grade wood for specialty articles such as veneers and musical instruments. The remaining forest land will probably be managed on a sustained yield basis for maximum production of required products such as reparations, exports and domestic needs.
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