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NOTES ON OBERLAENDER TOUR - *JULIAN Mc GOWIN*

September 26, 1936

GENERAL BACKGROUND OF GERMAN FORESTRY

Land Area of Germany: 470,713 kilometers

Total Population: 67,000,000 to 68,000,000

Density: 45 per square kilometer

Density in United States: 14 per square kilometer

In Germany there is a scarcity of almost all raw materials and hence the importance of their former colonies. After the Franco-Prussian war, Prince Bismarck founded the United German State. The population then was forty-two million. In 1914 the population was sixty-five million. All of this increase went into industry and commerce. There was no increase in the number of people engaged in agriculture, so as early as 1871 the tillable land available was completely taken. Since the war there has been a decline of the possibility of increasing the export of manufactured articles. Unemployment has been a serious problem. At the beginning of 1933 there were six million unemployed plus another fourteen million who were dependent on them, so when Hitler came into power in February 1933 he was faced with the necessity of finding work for these unemployed. This has been done in four years by (1) building roads, (2) draining swamps, (3) reforestation, and (4) re-arming. This is a short-range program. A long-time program must be devised to employ these people and this will require more territory to develop. Germany will have to rely on the understanding of the rest of the world or strong armaments.

All of this shows that the forest area must be managed intensively. Germany lost two million men in the World War. Three quarters of a million died of starvation. Six and one-half million were in the territory taken away.

In spite of this the population is again as great as before the war. The population losses have been made up in twenty years. Due to overcrowding in cities, the birth rate has declined and it is one of the aims of the Nazi Party to increase the birth rate in order to maintain the proper percentage of young people. The increasing feeling of nationalism (autarchy) on the part of various countries is not an intellectual problem but a political one. This feeling has been intensified in Europe during the recent years because of the renaissance and growing power of the German Nation.

DATA ON LAND USE IN GERMANY

Land:

63% agriculture
27% forestry
10% (waste land 4% and 6% rivers, lakes, roads, railroads, cities, etc.)

Agricultural land:

46% plowed land
11.7% hay meadows
5.3% pasture land

Forestry land:

11.2% softwoods
7.8% hardwoods

The forest area is the minimum or the smallest possible relation between forestry and agriculture. The forests in general cover areas which are not suitable for agriculture. It is the result of an evolution going back 1,000 years. First, clearing took place in the eighth and ninth centuries when the population of Germany began increasing. This increase repeated in 11th and 12th centuries. Beginning of 13th century we find first laws to preserve forests -- this in Western part of Germany. Meanwhile in Central and Eastern Germany the clearing continued until 18th and 19th centuries. Result of this slow colonization was that clearing was done only in areas suitable for agriculture.

In a new country timber will be cut and attempt will be made to sell the land for farming regardless of its suitability for farming. This may (and has in many cases) result in attempts being made to farm submarginal land.

Germany could not feed such a dense population if it was not for this organic land use. The use of each piece of land according to its suitability.

In some particular locations over-exploitation took place, but it never reached much extent because owners insisted on sustained yield.

Forest Management systems date back to 1551. Land was never exploited with idea of taking fruits and leaving it, but always with the idea of making permanent settlements. There were exceptions to this in areas where the transportation facilities were good. Heidelberg is an example of this -- print of 1610 shows hills above city completely denuded while this area is now forested.

Proportion of age classes now normal which indicates that timber was not overcut even during the War, 1914-1918. Since 1865 the supply of timber has not been sufficient to supply the demands of the country. Instead of cutting more than sustained yield - the

deficiency made up by imports. In 1865, 313,000 c.m. of timber was imported. In 1875, 3,543,000 c.m.; in 1905, 9,000,000 c.m.; in 1928, 14,000,000 c.m.

FIGURES ON AREA, DISTRIBUTION AND SPECIES

Total Area (Forests): 12,654,000 hectares

This is .4% of the world's forest area. Russia owns 21%, British Empire 21%, Brazil, 13.5%, U.S. 9.1%.

England, France, Belgium and Holland have forest area which equals the forest area of Germany (12,654,000 h.) but through their colonies they control 30% of the forest area of the world. Among European countries, classified according to forest area, Germany is 4th. But according to forest area per head of population, Germany is 18th.

Force must always be accompanied by education to show the necessity of the measures employed; otherwise it cannot last long.

DISADVANTAGES OF THE CONVERSION OF BROADLEAVED FORESTS INTO PURE CONIFEROUS STANDS.

(1) Decay of forest soil. Oak and beech have lost in favor of Scotch Pine and Spruce. Now tendency is toward mixed stands. Insect dangers in pure stands.

(2) Beauty of landscape.

Prof. Gayer, in Munich was among the first to advocate mixed stands about 1890. This became national policy after advent of Hitler.

TOTAL FOREST AREA

32.65%	State Forests
15.53	Commercial Forests
1.62	belong to foundations
2.37	belong to cooperative societies

The balance, or 47.83%, are private forests. Of this, 12.9% entailed or otherwise bound; 43.9% free private forests.

This is regarded as a very desirable distribution of ownership. Private ownership has contributed many of the improvements in forest technique. Private forests have contributed progress. State Forests have contributed stability.

65% of German Forest area publicly owned or entailed - balance free 25% of total forest area is in free private small woodlots.

TYPES OF MANAGEMENT IN CONNECTION WITH OWNERSHIP

At beginning of 19th century there was no regular management

of State Forests. Many were overstocked with game, overgrazed, no working plans. At the beginning of the 19th century several great men started to build up a systematic forestry program:

Heinrich Cotta (founder of Theraudt (creator of science of management and working plans)

George Ludwig
Hartig: Director of Prussian Forests

Employed two principles (1) cut only increment, (2) reforest what has been cut.

Result of this: (1) Timber production was much increased. In some places almost trebled and on an average doubled between 1830 and 1904.

Management of State Forests directed toward creating maximum social use. Originally, forests under Minister of Agriculture or Finance, but gradually its importance was realized and appreciated until 1933 when separate Ministry of Forestry was created. Goering, first Forest Minister, is not a forester but is well advised by practical and competent foresters.

Under this Ministry:

Forestry
Parks
Game
Recreation
Timber industry

Proper use and distribution of timber products possible only under ministry of central direction. Mine props, etc. from Scotch Pine sent to Rhine area -- paper industries shifted to make use of the Spruce, etc. formerly used for this purpose.

GERMAN GAME MANAGEMENT

On July 3rd, 1934, a new hunting law was passed -- it was valid for all of Germany and it set up a centralized organization for the control of hunting. The State Hunting Master at the head of this organization is the Minister of Forestry (Goering). He has an advisory council of 74 members to advise him on hunting problems. Next there are: 5 Provincial Hunting Masters, 36 District Hunting Masters, and 759 Local Hunting Masters. All the above officers are honorary and there is no salary attached.

A person wishing to hunt must first secure a certificate. This is given only after a careful examination of (1) the character of the applicant, (2) his knowledge of hunting, (3) his knowledge of the game, breeding periods, etc. With the granting of the certificate he becomes a member of a national organization to observe and help enforce the game laws. Also, he must take out liability insurance against hunting accidents. After all this has been done, if the holder of the certificate is not a large land owner, he must buy hunting rights to a certain area.

Only holders of a certificate may hunt and peasants who own only a few hectares pool their hunting rights in order to sell them. On the other hand, groups of individuals often form clubs or companies for the purchase of hunting rights. 42,800,000 hectares or 90% of the area of Germany is under game management. Hunting rights on 52,818 units are owned by clubs or companies and hunting rights on 27,514 units are owned by individuals.

Not only are the seasons and amount of game which may be killed regulated, but the methods of hunting are also prescribed to prevent undue cruelty and unsportsmanlike practices. For example -- a stage may be shot only with a rifle. Poisoning, night hunting of hares with lights and such practices are forbidden. There are comparatively few violations of the law.

Because of the density of the population here, the reason for this organization is to improve and increase the stock of game and make it yield as much as possible. Accordingly, a game inventory is made each year and the individual land owners must submit to the local hunting master each year a plan showing the stock of game (this applies only to big game such as chamois, deer, boars, etc., and not to rabbits and partridge) on his preserve and how many of each species (male and female) he proposes to shoot. If the hunting master approves this plan -- that amount must be shot. The purpose of this is (1) to keep a preserve from being overstocked, (2) preserve the proper ratio between males and females (now 1 to 2), and (3) kill off the weak and defective stock. A private land owner is not free to handle his game as he pleases, but his land must be under game management and this must conform to the requirements set up by the National Organization. A land owner may fence an area as a deer park but if it is very large or interferes with the productivity of the timber -- it may not be permitted.

The results of the operation of this law have been very encouraging and the amount of game killed each year is large (see green book for figures). At the same time it can be shown that the quantity as well as the quality of the game is improving. Even for small game such as rabbits, partridges, pheasants, etc., where no limit except a season is fixed, the owner of the hunting rights see that enough is left to insure a sustained yield.

September 16, 1936 (Wednesday)

Near Horn, Austria (80 miles from Vienna)

ALLENSTEIG FOREST

Owned by the Government and operated by the State Forest Service. This property belonged formerly to Count Joachim Von Windhag who died in 1678 leaving the income of the forest for educational purposes. The State now acts as Trustee and Operator and the net proceeds are still used for various educational purposes.

Area: 842 hectares

Altitude: 600 meters

Rainfall:

Species: 78% spruce, 11% fir (Pectinata), 11% pine (chiefly Sylvestries) and other species.

In 1862 the management plan was changed from selective cutting to clear cutting but in 1896 selective cutting again adopted. In cutting, particular attention is paid to the prevailing winds and the danger of trees being uprooted in wind storms. Cutting is always started on the north side of a tract and in this way natural reseeding is helped. Eighty and ninety year rotation. Total stand in 1931: 273,770 cubic meters. Estimated annual sustained yield capacity: 7,470 cubic meters. Of this, 1,780 cubic meters would be in thinnings and the balance in regular cuttings.

The actual cut has been:

1876-1925:	311,000 cu.m.	- Average growth:	6,221 cu.m.	per year
1926-1935:	85,168 " "	" "	8,517 " "	" "

The average cut per year 1876-1935: 6,604 cubic meters

For sixty years the average annual cut per hectare has been eight cubic meters. This has been composed of 75% saw logs and pulp wood -- 25% firewood.

Net income for 10 years:

1926	77,325	Schillings
1927	50,439	"
1928	70,662	"
1929	127,841	"
1930	17,526	"
1931	15,176	"
1932	19,380	"
1933	105,642	"
1934	18,781	"
1935	41,687	"
TOTAL	594,463	"

Thursday, September 17, 1936

AFFORESTATION OF SAND DUNES: MARCHFELD FOREST

Location: On Plain near Vienna

Owner: Nine communes

Area: 800 hectares

Altitude

Rainfall: (about 15 inches annually, comes chiefly in thunderstorms)

Water Level: 17 meters below the ground

The forest of Marchfeld is located in a plain about forty kilometers by ten kilometers which was the bed of a prehistoric lake. It is a mixture of fertile soil and sand dunes but farming has always been difficult because the prevailing winds blow the sand into the fertile areas.

In 1770 afforestation was attempted in order to hold the sand dunes and afford a shelter belt for the land in cultivation. The species selected were not suitable but in 1880 systematic afforestation was started with Black Pine. This work was carried out by the nine communes owning the land under the supervision and with the assistance of the Government Forest Service. An area of eight hundred hectares was selected and the outside planted first. The inside area is being planted and the forest is being gradually enlarged as funds are available for this work. The plantations have been greatly damaged by rabbits but fences are now built against them. Some of the stands are now almost sixty years old and afford some revenue from timber and resin but not yet enough to pay the maintenance cost of the forest.

This forest area of two thousand acres shelters or acts beneficially on sixty-two thousand acres, which area is inhabited by fifteen thousand people. The agricultural production in an area two hundred yards around the forest is four times greater than the average of the other land. The next two hundred yards also shows a marked increase.

Black pine was selected for planting in this area because it is native to Jugoslavia where the summers are hot and dry. It will grow on almost barren soil. The natural area of Black Pine in Austria is small -- about two hundred thousand acres altogether of which seventy thousand acres are pure stands. It is the only tree yielding resin in commercial quantities.

Thursday, September 17, 1936

FOREST OF ALTHOF

Location: On Plain near Vienna

Owner: Count Fraun Abensperg

Area: 290 hectares

Altitude:

Species: 50% Black Pine, 25% Oak, 15% Birch, 10% Other Species

Like Marchfeld Forest (which is not far away) the Forest of Althof was established for the protection of the agricultural land. Scotch Pine planted first but now plantings all Black Pine. Plants are kept in seedling beds three years because of the May Beetle eating the roots of the younger trees. A sixty year rotation is used because growth rate decreased after that age.

Friday, September 18, 1936

NASSWALD: Forest Including Reistal Valley

Owned by the City of Vienna

Area: 25,000 acres (75% Forest Area - 25% Pasture Land)

Location:

Altitude: 3,000 ft.

Species: Spruce, Fir, Larch, Scotch Pine, Beech, etc.

The area was bought by the City of Vienna from Count Hoyos in 1890 and since this is the source of the city water supply, the area is managed with the primary purpose of conserving a supply of pure water. Some of the slopes above the springs are fenced and planted with a dense stand of timber. Considerable cutting is done but the yield is small as compared with commercial forests. The yield is 15,000 cu. m. per year. Also, hunting rights on a large part of this area are leased for 25,000 schillings per year. The present stock of game is estimated at:

500 Red Deer of which	100 are shot each year
600 chamois of which	70 " " " "
300 roe deer of which	45 " " " "
100 woodcock of which	20 " " " "

In some cases hunting rights are sold giving the holder permission to shoot - 1 chamois - 200 schillings
1 red deer 300 "

In this area water transport has been most important in the past and an elaborate system of canals was constructed. Now, however, road transport is becoming more important - particularly for the larger timbers. Twenty-four schillings per thousand feet b.m. is paid for felling and delivering logs and cordwood to the roads or streams.

Friday, September 18, 1936

NEUBERG STATE FOREST

Location:

Area: 30,000 acres

Altitude:

Species:

This is an example of a complete Forest Unit, entirely owned by the State, including a transportation system to bring the logs in and a complete sawmill. The average yield of the forest is four cubic meters per hectare per year. Of this, 50% is in sawlogs, 25% pulpwood, and 25% firewood. The sawmill is leased to a private operators who buys the entire output of sawlogs.

Water transportation is largely used in bringing logs to the mill. A dam and log boom is located one and one-half miles upstream from the mill and a flume brings the logs from there on to the mill. The flume flows into a separator just above the mill yard which permits the sorting of the pulp and firewood and even the logs for size.

The total cost of the flume and mill was 800,000 schillings (\$160,000) and this will be repaid in rent in ten years, eight of which have already passed. The mill pays sixteen schillings per cubic meter for sawlogs. For each cubic meter bought, sixty-two percent goes into lumber and the balance into sawdust and waste products. Three hundred families are employed in mill and woods.

An Austrian equivalent to our CCC Camp was visited in the Reistal Valley. This was a side camp of twenty men from the main camp of about sixty men.

Ages	15 to 24
Enlistment period	40 weeks
Wages	50 groschen per day plus maintenance, clothing and 10 cigarettes.

Total of 7000 to 8000 boys in these camps with more applicants than can be cared for under the budget available. Their day is divided into 6 hours work, 2 hours education, 1 hour sport. Technical education is provided to help them get a job on leaving.

Cost of maintaining men - 3.50 schillings per day.

These camps available to individuals or organizations for certain classes of work on payment of one schilling per man per day.

Saturday, September 19, 1936

FOREST OF ERNESTREITH

Owner: Count Hoyos

Location: Near town of Horn, Austria

Area: 1,200 Hectares

Altitude: 500 Meters

Rainfall; 750 millimeters per year (about 30 inches)

Species: Spruce, Scotch Pine, Silver Fir, Horn Beam,
Bass Wood, Beech, Oak, Larch and Birch.

Forests up to sixty years are pure stands of spruce, older stands are mixed. A new working plan was drawn up forty years ago and it is revised and a new inventory made every ten years. The annual yield is now 6,710 cu. m. The present stand on the mature or 100 year old areas is 60,000 ft. b.m. per acre. The average annual yield of the forest is 550 ft. b.m. Of this forty percent is sawlogs, 30% pulpwood and 30% firewood.

Count Hoyos owns altogether about 25,000 hectares. The land tax amounts to thirteen schillings per hectare per year and there are two other taxes amounting to seven schillings. In addition to this, he pays an income tax depending on the net return. Workmen receive three to four schillings per day and in addition have a small plot of land to till.

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At Gutenstein we visited one of Count Hoyos' Castles, which contains one of the world's finest private collections of hunting trophies.

There are three distinct regions in the Alps - (1) the southern, which is made up of lime rock and calcareous soil, (2) The Middle region, composed of granite rocks of volcanic origin, (3) The northern region which is the same as #1.

In the lime region the principal species are beech, silver fir, and spruce. In the middle region - spruce, larch and small amounts of beech and fir.

The Southern slopes are warm and dry and consequently more difficult to reseed naturally. Clear felling is done chiefly on the northern slopes.

Austria is one of the first countries to recognize the indirect benefits of forestry and its effects on climate, moisture, and soil conservation. It has model forestry laws but one of the main problems has been to get the cooperation of the small woodlot owners who holdings total a large percentage of the forest area. This has been met by the formation of cooperative societies for the purpose of attaining sustained yield management in areas made up of very small holdings. These societies handle sales of forest products as well as supervise the management and the acreage under this form of control is increasing in spite of opposition at first on the part of the farmers. The Government encourages and furnishes assistance to these societies.

September 22, 1936

FOREST OF PRINCE SCHWARZENBERG

Near Hluboka, Czechoslovakia

Revier: Welechwin

Area: 2,140 hectares -- 60 hectares in roads and otherwise not stocked.

Altitude: 450 meters

Rainfall: 500 millimeters (about 20 inches) well distributed throughout year

Yield: 8,400 cubic meters annually. Of this amount, 7,000 cu. m. is in final fellings and the balance (1,400 cu. m.) in thinning young stands. 65% of cut is in sawlogs, 10% pulpwood, 25% firewood.

Species: Scotch Pine, Spruce, Silver Fir, Beech, Larch, Birch.

Nine men are employed in this Revier (district): 1 forester, 1 assistant forester, and 7 guards.

This forest has been under a working plan since 1852 and this plan is revised every ten years when a new inventory is made. This inventory shows amount in each diameter class and value can be computed from this. The average annual net income is now about 100 kronen per hectare. Before the depression this came to six or seven hundred kronen. There are two taxes: (1) A land tax based on the value of the land (for this forest it is 20 kronen per hectare per year) (2) Income tax which is on a graduated scale up to 60%. The relative importance of these two taxes may be seen in the totals collected in Czechoslovakia. These were: Land tax, 300 million kronen; Income Tax, 1200 million kronen.

Properly stocked forest land here is valued at about 2,000 kronen per hectare (?) 20% represents the value of the land.

This forest is typical of many in central Europe and they may be said to have gone through three phases. The first came when there were still ample stands of virgin forest in Europe which meant unregulated cutting, followed by heavy grazing and degeneration of the soil. The second phase which began roughly about 1800 saw planted stands of pure spruce, scotch pine and other species which had a high commercial value. Under this method, however, the productivity of the soil declined. Virgin stands of beech, spruce, silver fir, scotch pine have a volume of 750 c. m.

per hectare and this volume is maintained for the first generation afterwards. The second generation of a planted stand of pure spruce has a volume of 500 cu. m. and the third generation will show less. This led to the third phase in European forestry which began about 1900. This is selective cutting and regeneration of mixed species (including beech or other broad-leaved hardwoods) that will maintain the productivity of the soil.

This Revier Welechwin has gone through all three of these phases and now selective cutting is employed. A cut is made in mature stands every three or four years and the worst trees removed. The open spaces are then planted if this is necessary to insure a proper mixture of species, otherwise natural reseeding fills in the open spaces.

FOREST OF PLOCKENSTEIN

Owner: Prince Schwarzenberg

Location: In Bohmerwald Mountains. This is a ridge separating Austria, Germany, and Czechoslovakia

Altitude: 1,200 meters.

Rainfall: 1,000 millimeters (about 40 inches)

Climate: Severe - 30 to 40 degrees C. in summer - below zero with heavy snows in winter

Area: 20,000 hectares

Present Stand: 5,500,000 cubic meters or average of 285 cu. m. per hectare

Annual yield: 115,000 cu. m. or 6.2 c.m. per hectare per year of the wooded area.

Species: Spruce (most important), silver fir, beech, mt. ash, elm, etc.

The forests of Plockenstein were virgin woods about two hundred years ago. They had not been exploited because of their location in the mountains and the difficulty of transportation. In 1730 an engineer named Rosenauer began the construction of a canal fifty three kilometers long flowing into the watershed of the Danube. The principal product was firewood, which was sold in Vienna. This canal was a very skillful piece of engineering and was so laid out that logs and cordwood could be floated to the Danube or to the Moldau.

The most important product now is sawlogs and in 1850 the canal was reworked to permit the floating of 70 ft. logs. Vienna is no longer an important market and practically all the timber cut is now assembled at a yard at Salnau from where it is shipped all over Europe.

Even in 1730 when this exploitation was first begun, Prince Schwarzenberg ordered that it be carried out on a sustained yield basis. In this area the underlying rock is granite and the sandy loam soil is favorable for tree growth. Agriculture is impossible except in the valleys where pastures and small farms are found. The population of this region is dependent on forest work. Felling is done during the summer and autumn and as soon as enough snow has fallen the logs and cordwood are hauled to the edge of the canal. When the snow melts in the spring they are floated down to Salnau.

The proper exploitation of this forest has left a very valuable stand. The average shown is 285 cu. m. per hectare, but some individual hectares have as much as 1,000 cu. m. The average volume for mature (100 year old) stands is 575 cu. m. per hectare which is higher than the virgin stand. The forest law (in Czechoslovakia) permits a minimum rotation of 80 years, but this is on a 100-year rotation. (100-year rotation means that approximately 1/100 of the stand is cut each year.) Selective cutting is used and wherever possible the stands are re-stocked by natural regeneration. Otherwise clear felling and replanting is done to insure the proper mixture of species -- about eighty hectares are planted each year.

FOREST OF SPESSART

Revier: Rohrbrunn

The forest of Spessart was given by the Emperor Otto I to the Bishop of Mainz in . It was generally believed then that the world would come to an end in the year 1000 and the Emperor wanted the Bishop to assure him a place in Heaven. This forest of about 150,000 acres was highly valued as a game preserve and the Bishops closed it against settlement, timber cutting or exploitation of any kind. The area was carefully protected and the penalty for trespassers or poachers was death. The only clearing came during the period of the Thirty Years War from 1618-1649. During this time many peasants fled into the forest for safety and cleared fields, cultivating them for only a few years. After this, however, no further exploitation took place until the time of Napoleon when the rule of the Bishops was ended and their territory became a part of the Kingdom of Bavaria. Since that time the forest has been under sustained yield management by the Bavarian State Foresters and the first thinning was done in 1825.

The principal species here are oak and beech and some of the oak trees are 1,000 years old. Due to their age and high quality some of these trees sell for as much as \$2500 each. Hence, the purpose of the management is to preserve and maintain the quality of the stand. A 300-year rotation is used for the oak and 150-year for the beech.

The trees to be cut are selected very carefully. No tree is cut until its age and condition indicate that it is mature or will no longer increase in value. When any cutting is done particular care is taken to see that no open spaces are left that will cause the remaining oak trees to put out small branches. The ideal is to leave the proper density of oak and beech that will grow clean, straight boles on the oak trees. In some parts of the forest there are oak trees three hundred years old which are not yet considered ripe for cutting.

The cutting is done in November and the valuable oak trees are cut by cutting the roots below the ground and sometimes a hydraulic pump is used to push them over slowly. When the tree is down an expert marks how each tree is to be cut up so as to bring its maximum value. Each log is then numbered and described in a catalog and a day is set for an auction. In the meantime the various buyers (veneer and furniture works) inspect the logs and attend the auction to bid on the ones they want.

The Revier of Rohrbrunn consists of 5,400 hectares and 4,200 cu. m. are cut annually.

On another Revier of 10,600 hectares the total cut was cu. m. of which 7,500 cu. m. was oak. The total receipts for this area were R.M. 1,200,000 of which 40% is net.

The German equivalent to our CCC Camps are compulsory for all able-bodied German boys when they reach twenty. The service is for six months. A camp consists of 216 men who are in charge of a commander (not military) 4 under officers and 12 foremen.

The summer schedules are as follows:

7:00 A.M. to 2:00 P.M. work
2:00 P.M. to 4:00 P.M. lunch and free time
4:00 P.M. to 7:00 P.M. sport and one hour education

The men receive clothes and complete maintenance plus 25 pfgs. per day.

FOREST OF COUNT VON ARNIM, MUSKAU

The forest management plan here is revised every ten years and volumes estimated by sample plots. The aim is to retain the proper ratio of age classes. The annual cut is the area divided by the rotation, which in this case would be 25,000 hectares divided by 100 year rotations, equalling 250 hectares cut over each year. The estate has been owned as a trust since 1908 and its provisions make the eldest son first officer of the trust. The idea was (1) to insure sustained management as a matter of public interest, (2) to preserve the Park of Muskau, which is of particular interest and beauty, and (3) the net revenue is distributed among the members of the family according to an established proportion.

This estate is a complete forest unit, as factories have been built to utilize not only the products of the forest, but the clay and lignite coal which are found on this property. There is a sawmill, paper mill, factory to make coal bricks, brick plant, and ceramic plant to make clay pipes, containers, etc. The area is divided into four administrative forest divisions and the transportation division is separate. More than fifty trained foresters are employed. Approximately 2,000 families are dependent on work in these factories and in the forests. The forest yield per year is 72,000 c.m.

Careful records are kept which contain information enabling the establishment of a definite management plan. This consists of (1) Description of the forests and principles of management. Also, a yield calculation graph of the area in various age classes and diameter classes, (2) Books are kept showing the amount of timber to be cut from each area. Columns are provided in which are entered the work prescribed by the foresters and opposite are columns showing the cuttings actually done, (3) The same kind of books are kept for the thinnings, and (4) All blank areas are reforested.

Short explanation for the inspection of the Graf von Arnimschen Waldgutstiftung "Standesherrschaft Muskau O/L". The enclosure shows the subdivision of the "Timber Trust" (Waldgutstiftung) in its special departments.

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History: Owners since the 10th century A.D. The governing house of Bohemia, the dukes of Brandenburg, the noble houses of von Ileburg, von Kittlitz, von Penzig, von Biberstein, von Schoneich, Count Dohna, Count Callenberg, Count Puckler, the son of whom, Duke Herman Puckler, creator of the park, was the owner of this estate from 1811 to 1845. The successors were the Counts von Nostitz and Hatzfeld-Schonstein and then from 1846 on Prince Frederick of Holland. The heirs of the latter transferred the estate in 1883 to Count von Arnim. He was the owner from 1883 until his death in 1919; from 1919 followed Count Adolf von Arnim, and thereafter Count Hermann von Arnim. In connection with the political events which took place after the war, the "Standesherrschaft" was transformed into a "Timber Trust" (Waldgutstiftung).

Geographical Location: The estate is located in the county of Rothenburg O/L, province of Silesia, between the rivers Neisse and Spree. The estate is about 26,800 hectares large and forms an almost complete unit. The following state-railway lines cross the estate; Berlin-Gorlitz, Weisswasser-Forst, Weisswasser-Teuplitz, furthermore the following state-highways: Muskau-Bautzen, Berlin-Gorlitz, Muskau-Priebus, Muskau-Triebel.

Description of the geological location of the woods:

Location: The Muskauer woodland is located in the end territory of a moraine. The countryside is wave-like. Aside of the Neisse-valley there are no other canyons of larger proportions. The height above the sea-level is 100 to 160 m.

Climate: The climate is moderate. The yearly rainfall amounts to about 650 mm.

Soil: The soil belongs partly to the Teriar, Diluvium and the Aluvium. The primary rocks are nowhere to be seen. Sand, loam, clay, moors and gravel are changing in different thickness and density. The level of the groundwater is deep. Large deposits of lignite has been ascertained underneath the territory.

Species of trees: Almost exclusively (97%) pine (*pinus silvestris*). The remaining part is spruce (*picea*), oak (*quercus*), birch (*betula*) and other foliage trees.

Organization of the forestry: The first survey took place in the year 1860. The forests were divided into about 700 sections (Jagen). The size of a normal section (Jagen) in quadratical form is 46 hectare. The

sections are now divided by larger and smaller paths through the forests, which run from north to south and from east to west. Since the year 1862 the administration is being handled according to viewpoints of forestry technics. The first budgets (Betriebsplane) were compiled in the year 1889 according to the calculations of the Prussian State. Since 1904 these budgets are composed along the lines of calculations of the respective bureau of the state of Saxony and are newly drawn up every ten years. Since 1904 the rules has been established to revolve timber cutting within one hundred years, whereby during one year no timber will be cut. The cutting is done mainly from east to west, partly also from north to south.

The age of the forest at the present time is as follows:

bare wood -	1-20	21-40	41-60	61-80	81-100	over 100 years	
land ha	190	5160	2900	3930	4800	4350	2000

During the last years about 600 hektar have been sold for the creation of small farms.

The amount of timber which is being cut yearly is at the present time about 70,150 fm (logs) Derbholz). This is about 2.9.fm per year and per hektar. The amount of timber available was estimated at the time of the last assessment at about 3 million fm which is about 126 fm logs (Derbholz) per hektar. At present there is a new assessment which will probably show an increase. From the yearly cutting of timber about 70% are resulting from the "general cuttings" (Hauptnutzung) and about 30% of the "preliminary cuttings" (Vornutzung). The general cuttings result in bare sections (Kahlschlagen) and are also made from so called "Plenterschlagen". The "Preliminary cuttings" result from cutting timber in younger forests yielding about 1 fm per hektar. The "preliminary cutting" will be increased in future.

The timber (Derbholz) yields about 93% of useful lumber (Nutz-Holzer).

The yearly cut of timber is ordinarily divided into the following classes:

Timber for building purposes and lumber mills	ca.	35,000	- fm.
" " mines	"	3,000	- fm.
" to be used for cardboard manufacturing	"	27,000	- fm.
firewood	"	5,000	- fm.
	Sa	70,000	- fm.

From the timber for building purposes and for the use of lumber mills about 20,000 fm are being cut in lumber mills belonging to the state. The remaining part is sold. The sales possibilities are advantageous, because the woodland is easily accessible.

The timber for mines is needed for the mines which belong to the estate and the timber for the manufacturing of cardboard for the own cardboard factory. (For details please see enclosure)

Future policy for the maintenance of the woodlands:

The pine will also remain in future the main species of trees. We endeavor to raise forests with different kinds of trees by planting foliage trees. The bare acreages are replanted either by plantation methods or by seed. Certain sections of the forest will naturally be rejuvenated. It has partly been started to make reserve cuts which will be increased according to more recent viewpoints.

Forest protection: The pine trees have been hit by several calamities during the course of the last years. During the year 1906 to 1908 appeared the bombyx pini and lipavis monacha through which about 1,000 hektar were annihilated. In 1924 panolis piniperda, which however only ruined about 50 hektar. The bare sections in the forests resulting from cutting lines of woods (hiebszuge) has been of great help in this connection.

The forest is greatly endangered by fire. A well equipped system of fire alarm with 10 watch towers enable us to find out quickly the exact location of the fire, thus creating the possibility of bringing immediate help. There has been no major damage caused by windfall and snow storms. In spite of the calamities described above it has been achieved to maintain an equableness in timber cutting and the density of the forests.

Forest administration: There are the following kinds of game on the estate: elk, deer, roes, boar, hare, rabbits, Auerwild, Birkwild, feasons, partridges, ducks; there is a deer-garden of about 2500 hektar.

It is intended to make a special excursion through the for-estries Muskau and Skorbersdorf and the foreries Weiss-Wasser and Jagdschloss, furthermore to inspect the part, the card-board factory and the wood mills.

Muskau O/L, den 11 August 1934

FOREST OF ROMINTENER-HEIDE

Location: Near Lithuanian border in East Prussia

Owner: State of Prussia

Area: 25,000 hectares

Rainfall: 700 mm

Species: Scotch pine, spruce, oak, linden, alder, birch, hornbeam, aspen.

Yield annually: 110,000 c.m. or about 4 c.m. per hectare

Altitude: Up to 300 meters

Soil: Sand loam with small swamps

This area was one of the most favored hunting grounds of the German Kings. Visit to Castle -- the whole area is fenced since 1890 and the finest stags in Europe are found here. Red Deer, Roe Deer, Wild Boar, Fallow Deer.

In 1850 almost all the forest was damaged by an epidemic of nun moth. Reforested with pure stands of spruce. Since 1933 another attack of nun moth (one-half million cu.m. timber cut out) but this stopped by spraying arsenic and contact poison from airplanes -- 10 planes used for this. 4,000 hectares forest saved. Cut over places now being reforested with broad-leaved oak, scotch pine, some spruce, (natural regeneration), birch, alder. Working plan is to change pure stands of spruce to mixed stands. Selective cutting employed wherever possible but game does so much damage that small areas are cut, fenced and planted.

New hunting castle built by Goering. Norwegian style of the old castle -- built of wood.

PENINSULA OF KUHRISCHEA NEHRUNG

The Peninsula of Kuhrischea Nehrung connects part of East Prussia with Lithuania and forms the Kuhrischea Haff. This Peninsula affords an interesting example of forestry done with the main purpose of holding the soil and affording the people in the villages of Pilkoppen and Rositten firewood and grazing areas.

Neolithic implements are found on the Peninsula and it has been inhabited for many centuries, but during the Thirty Years War (1618-1648) the forests were cut away and sand dunes started forming in their place. This process continued and by 1880 seven villages had been completely destroyed by the shifting dunes. About this time a forester named Eva started some reforestation work to save the two above named villages -- especially Pilkoppen.

Because of the shifting dunes and the prevailing northwest winds from the Baltic Sea, it is extremely difficult to get trees to grow. First stakes are driven in squares of about ten feet to hold the sand so grass and other plants will grow and add humus to the soil. After some years this is followed by planting trees. Originally, *Pinus Montana* was planted in pure stands. This was done always on the fore dune or the one on the windward side next to the Baltic, except the area near Pilkoppen. Now it is realized that because of the difficult conditions and the poor quality of the trees birch trees should be allowed to come in wherever they will reseed naturally. The only product gathered is firewood. For one-third of the distance they get small timber suitable for mine props.

This is a clear example of the damage that might be done from cutting away the forests, reforestation under extreme difficulties and the effectiveness of forestry in making this peninsula habitable.