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REPORT

ON A

PRELIMINARY EXAMINATION OF THE FOREST LAND OF THE UNITED STATES NAVAL POWDER DEPOT NEAR DOVER, NEW JERSEY

By

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General Description

Acregage and Location

The United States Naval Powder depot comprises an area of 393.58 acres. It is situated in Morris County, New Jersey, about six miles from Dover, a station on the Delaware, Lackawanna and Western Railroad, 41 miles from New York City.

The reservation adjoins the Picatiny Arsenal Reservation of the Army on the southeast and southwest, and lies adjacent and south of the Wharton and Northern Railroad of Morris County Railroad. This railroad forms the dividing line between the two reservations. For this reason the reservation is very accessible from Dover, and it can be reached by driving seven miles over very good macadamized roads.

The Naval Powder Depot was originally a part of the Picatiny Arsenal Reservation. Three hundred and fifteen acres were turned over to the Navy Department in 1891. Later a purchase of 78.58 acres was made in November 1902 and added to the southwest part of the reservation.

Condition of Roads and Accessibility of Tract

The reservation is divided from east to west by a well-graded macadamized road which offers a very good base for a system of wood roads and bridle paths. The tract is bounded on the south and east by the county road to Dover. Numerous gates along the road afford access to old wood roads through the northeastern end of the reservation.

A stone crusher is maintained on the tract to dress the roads.

Description of Locality and General Topography

The whole reservation extends over gently-rolling hills arising from Picatiny Lake. The highest relative elevation does not exceed 160 feet. The general elevation is approximately 1000 feet above sea level.

The soil, of glacial origin, is very favorable to the growth of hardwoods; in fact, almost the entire area is potential forest land.

The Powder Depot has been established now for seventeen years. There has been a good deal of cutting since then, chiefly to clear areas in the vicinity of the powder houses as a precaution from brush fires. The tract hardly shows the effect of fires. None of any importance have occurred for some time, since every care is taken.

The first cutting was done at about the time of the Civil War, and as a result there is now a very thrifty growth of timber, where conditions have remained undisturbed since that time.

Object of the Navy Department

A small portable sawmill has recently been erected in connection with the stone crusher and it is the desire of the Chief Gunner in Charge of the Depot to be able to cut on specifications sufficient lumber for construction purposes about the reservation, and occasionally to secure ties for the spur lines to the various powder houses. At the same time a certain amount of clearing is necessary to prevent brush fires from approaching the powder houses.

Forest Description

Throughout the reservation the forest stand is composed of mixed hardwoods of sprout origin. The prominent species occurring are chestnut, rock oak, red oak, hemlock, red maple, sugar maple, black birch, hickory, basswood, ash, poplar, ironwood, dogwood, and witchhazel. By far the greater proportion of the stand is made up of the first five species.

The stands are scattered and in area from a few acres to nearly eighty. They are in the main even-aged, the result of periodic clean cuttings. Save for the main woodlot in the northeastern end of the tract they do not date back over fourteen years.

The main woodlot of about 80 acres and a small patch in the extreme southwest corner represent the only area now bearing merchantable timber. These particular areas represent the result of the oldest cutting--about the time of the Civil War--although they have been culled over from time to time

for poles and ties. (Exhibits 3, 4, and 5.)

The average diameter here would roughly approximate 9 inches, the height 50 feet, and the age about 50 years. Scattered veteran chestnut and pin oak over 20 inches are occasionally found.

The remainder of the reservation, as has been said, consists of even-aged sprout thickets of varying age classes from one to fourteen years. (Exhibits 2 and 9.) These stands were the result of clear cuttings for the protection of the powder houses.

It is not believed that this system of clean cutting is the proper one to afford fully adequate fire protection. It can not be doubted that a fire in one of these thickets would be much harder to fight and control than one in the main woodlot.

Sprout land when cut over and free from unnatural influences produces a new growth with astonishing rapidity. A growth of five feet in one growing season is not at all uncommon. Clearly the best system, unless the stumps are grubbed out and the land sown to grass, is one of thinnings just heavy enough to afford unbroken shade to the forest floor. If the thinning is too heavy the resultant light will permit the rapid growth of the sprouts. Sprouts need light to thrive and are not slow to take advantage of any opportunity.

Just below the main driveway northeast of the powder house is a good example of too heavy a thinning. The sprouts

are coming in here quite fast. (Exhibit 1.) Across the main road from the administration building can be seen the unfortunate results of clear cutting. (Exhibit 5.) This area was cut over about seven years ago. It now has the appearance of a jungle. The young trees average over fifteen feet high, and are so closely crowded that height growth is forced. Near one of the employee's houses, however, toward the Dover gate, is a small patch judiciously thinned. (Exhibit 7.) The trees stand so that the crowns just touch. As a consequence the forest floor is quite clean. Here a fire could be controlled with ease.

An excellent system has been devised for the protection of the storehouses. A weekly drill is required to maintain efficiency. A compressed-air locomotive is used to avoid danger from sparks. If, in addition to this drill, the patrol of the marines stationed at the reservation can be extended to include the main woodlot and the boundaries, the system will be ideal. This extended patrol is recommended.

No evidence was noted of the deadly fungus disease which is killing so many of the chestnut trees in the vicinity of New York. This bark disease caused by a fungus known as Diaporthe parasitica can be detected by the yellowish excrescences, resembling horns, that appear on the limbs. In the event of its appearance on the reservation the affected trees should be immediately cut and the bark removed and burned.

Treatment Advised

Any plan of treatment for the woodland of the reservation must be adapted to the primary one of storing ammunition and powder. It is therefore necessary, so far as possible, to know from year to year the plans for the future enlargement, in order that there may be no unusual effort wasted on land which must give way to the plans of the Bureau of Ordnance.

It is understood, however, that the future enlargement of the storage houses will not include the main woodlot for some time to come. On this presumption it is recommended that material cut from this particular area take the form of improvement cuttings. In these cuttings the object should be to produce saw timber as quickly as possible. By the sale of the small produce, or its use for cordwood, posts, ties, or fuel, the expense can be met. In order to accomplish this it is recommended that the main woodlot be managed under what is known as the Selection System.

A forest under the Selection System yields timber of large dimensions and quantities of small produce as well. It is a matter of time, in this case, since the forest is of sprout origin and more or less even-aged.

It should be understood that trees naturally divide themselves in classes. They are described by the forester as follows: Dominant, intermediate, suppressed, and dead. Dominant trees are those whose crowns are entirely open to sunlight.

Intermediate trees receive sunlight from above, but are shaded on the sides, and are likely to become suppressed. Suppressed trees are those which are entirely over-topped by other trees, and are slowly dying.

Ordinarily in an undisturbed forest there is a constant struggle among the trees. It is a struggle for light, the prime necessity for growth. By interfering in this struggle the forester can by the judicious removal of trees aid the promising ones to attain maximum proportions. It is evident that in a closely crowded stand the great struggle for light produces long and spindly trees of no value. If, however, some of these trees are removed, the crowns of the survivors are allowed to spread. In this way growth in diameter is greatly stimulated and merchantable produce is obtained. Too much light, however, will result in wide-branching crowns with short stems of little value for lumber.

Thinnings should be made among the intermediate class of trees for here the greatest good can be effected. The chestnut, rock oak, and hemlock should be left standing in preference to the maple and black birch. The hemlock by reason of its scattered occurrence should be retained, not because of its merchantable value, but for its aesthetic value. The hemlock foliage offers a very pleasing contrast to the sameness of the hardwoods. The oaks should be given preference over the chestnut, as chestnut of sprout origin is short-lived.

Straight, tall trees, with well-developed, thrifty tops, should be left in preference to spindling, weak-topped trees, or those which are crowded, unsound, and diseased.

Dead, dying, and suppressed trees should be removed; also such of the intermediate trees as are interfering with each other or are growing into the crowns of the dominant trees in a way that will prevent healthy development. In a group of equally good trees it is often best to remove one or more, as the remaining trees will then produce larger material than if all had been left.

In any of the cuttings, but in the main woodlot only, care should be taken so far as possible to leave a belt of trees on either side of any of the wood roads and on the boundaries of the reservation. The remaining wooded areas of the reservation require different treatment, where it is probable further clearings for storehouses will be made. The treatment suggested simply has in mind adequate fire protection.

It is recommended that a strip one hundred feet wide adjacent to all paths, roads, switches, and storehouses outside of the main woodlot, be very heavily thinned leaving only promising saplings that will develop into ornamental trees. All remaining stumps should be grubbed out and if possible grass-sown.

In the interior, thinnings should be made heavy enough to allow the crowns to touch and furnish a partial shade and prevent rank undergrowth. All debris and brush that is of no use for fuel should be removed to a place of safety and burned.

It will of course be necessary to return and thin again as soon as the crowns begin to crowd. In time a stand of well developed even-aged trees will be obtained with little or no growth beneath. The desired appearance of a park will be obtained. In ordinary forest management where the growth of merchantable timber is the object the treatment would be very different. (Exhibit 7.) It is this park form of forest which will prevent the least danger from fire at a minimum expense. It will certainly be far cheaper than frequent clean cuttings.

Market Study

Wood dealers in this locality are accustomed to buy stumpage by the acre. It is a poor method for the owner of the woodlot; in fact, one that makes conservative treatment quite impossible.

In the past before the reservation was set aside the tract was culled over for charcoal, posts, and cordwood, and later for ties and telephone poles.

There is a good market for these products. Cordwood is in demand for fuel and for the brick kilns. Ties and squared chestnut posts bring good prices.

J. S. Dickerson, the largest wood dealer in Dover, quotes the following list of prices f.o.b. at the Depot siding:

Mixed cordwood; for brick kilns down to 1" in diameter, and for fuel down to 3", $2.50 to $3.00 per cord.
Squared chestnut posts @ $20 per M bd. ft. 6, 8, 10, 12, 14 and 16' by 4 x 4, 5 x 5, and 6 x 6.
Ties 52¢ for rock oak and white oak.
70¢ for rock oak and white oak.

Wood cutters receive on the average 75¢ a cord. The haul is so short that the total expense of cutting and hauling should not exceed $1.50 to $2.00 per cord.

The extension of the switches to the various powder houses and the substitution of new ties will afford a certain demand for tie timber. It should not cost over 18¢ a piece to cut, log, and saw ties for the use of the reservation. At present $1 apiece is paid. Sawing ties is slightly more expensive than hewing. The presence of the sawmill, however, makes it pay, because considerable lumber can be sawed from the sides of logs which would be wasted if they were hewn. Then, too, the slabs can be used for fuel to run the mill and the adjacent stone crusher.

When the sawmill was first erected it was anticipated that considerable lumber could be obtained from the tract. Some of course can, but too much should not be expected. A chestnut tree 14" in diameter has hardly more than 100 feet of lumber. There are not many trees exceeding this diameter on the tract. The mill should well pay for itself if the small produce is utilized.

Summary

No great returns can be expected from a conservative treatment of this tract, since only about 80 acres can be fully treated without interfering with the object of the reservation. But cordwood for fuel and ties for the switches can be obtained

and will readily pay. At the adjoining Picatiny Arsenal of the Army it has been found that three cords of wood equal one ton of anthracite coal. So whenever cuttings are made the slabs and tops should be used for fuel.

The treatment of the remaining areas referred to is very desirable because of the great need for absolute fire protection, but not because of expected returns from forest management.

It is recommended that a separate account be maintained showing the expenses and returns from handling the timber on the reservation. These accounts should include the time and wages of the wood choppers, the amount of wood material cut and sold or used, and all other incidental expenses.

A preliminary examination of the adjoining Picatiny Arsenal of the Army was made by an officer of the Forest Service last winter. In that report a detailed working plan was recommended. It is desirable to supplement this recommendation with the addition that at the same time a detailed study of the Naval Depot be included.

The fact is emphasized that these two reservations including about 2000 acres comprise probably the largest body of Federal timberland in the east. Their situation in the northern hardwood region offers a splendid opportunity for the Forest Service to secure very valuable data on one of the greatest forest regions of the country.

A working plan should be made of these reservations. Cooperation between the War and Navy Departments should be secured in order that a study as a whole might be made. The working plan should include not only an estimate of the standing timber, yield tables and plans for future management, but a nursery for the propagation of important hardwoods and permanent sample plots. The value of the latter can not be overlooked. Furthermore the Office of Wood Preservation in the Forest Service should establish an experimental treating plant. A splendid opportunity is afforded for the Government operates about seven miles of its own railroad. Additional trackage is constantly under construction, offering abundant opportunity for experimentation with railroad ties.

In conclusion it is sufficient to state that cooperation between the Forest Service and the War and Navy Department will secure an excellent opportunity to advance every branch of forestry in a region where it is of the utmost importance and yet by reason of the absence of public lands no opportunity has hitherto been presented.

Exhibit # 1.

Hemlock standards and understory of small pole mixed hardwoods.

Exhibit # 9.

Twelve year old mixed hardwood sprouts small poles.

Exhibit # 3.

High sprout forest of mixed hardwoods cut over about 50 years ago for charcoal. This land has about 25 cords to the acre. Example of area in the main woodlot.

Exhibit # 4.

Example of area in the main woodlot. High sprout forest cut over about 50 years ago for charcoal; 12 years ago for ties; and culled over 8 years ago for telephone poles.

Exhibit # 5.

Mixed hardwood sprouts seedlings and saplings up to 20 feet high. Cut over about seven years ago. Contrast this with Exhibit # 7.

Exhibit # 6.

Example of clearing around a powder house.

Exhibit # 7.

Example of area properly thinned and now supporting a good cover of mixed hardwood small poles. Contrast the lack of litter here with Exhibit # 5.

Exhibit # 8.

Mixed hardwood poles. A type of the average appearance of the older trees.

Exhibit # 9.

Type of swamp coppice.