

THE HARVARD FOREST

BY THEODORE WOOLSEY, JR.

THAT Harvard University is conducting a logging operation is rather a startling statement; it is true however. Owing to the generosity of Mr. John S. Ames, who graduated from the Harvard Forest School of Harvard University with the class of 1909, the Harvard forest was acquired late in 1907. Mr. James W. Brooks, who owned 1800 acres, cooperated by placing a low valuation upon this land. Contiguous owners, with holdings in the aggregate of between 200 and 300 acres, deeded these additional areas so that today the Harvard Forest comprises more than 2000 acres. It was through the courtesy of Mr. Richard T. Fisher, Chairman of the Division of Forestry, that the writer was enabled to visit this tract on January 21st and 22d in order to study the silvical method of treatment.

According to the Official Register of Harvard University, "the forest lies on hilly country at an elevation varying from 800 to 1400 feet above sea level. It is divided into three distinct blocks of (about) 850, 550, and 600 acres, which are located respectively northeast, northwest, and southwest of the village."*

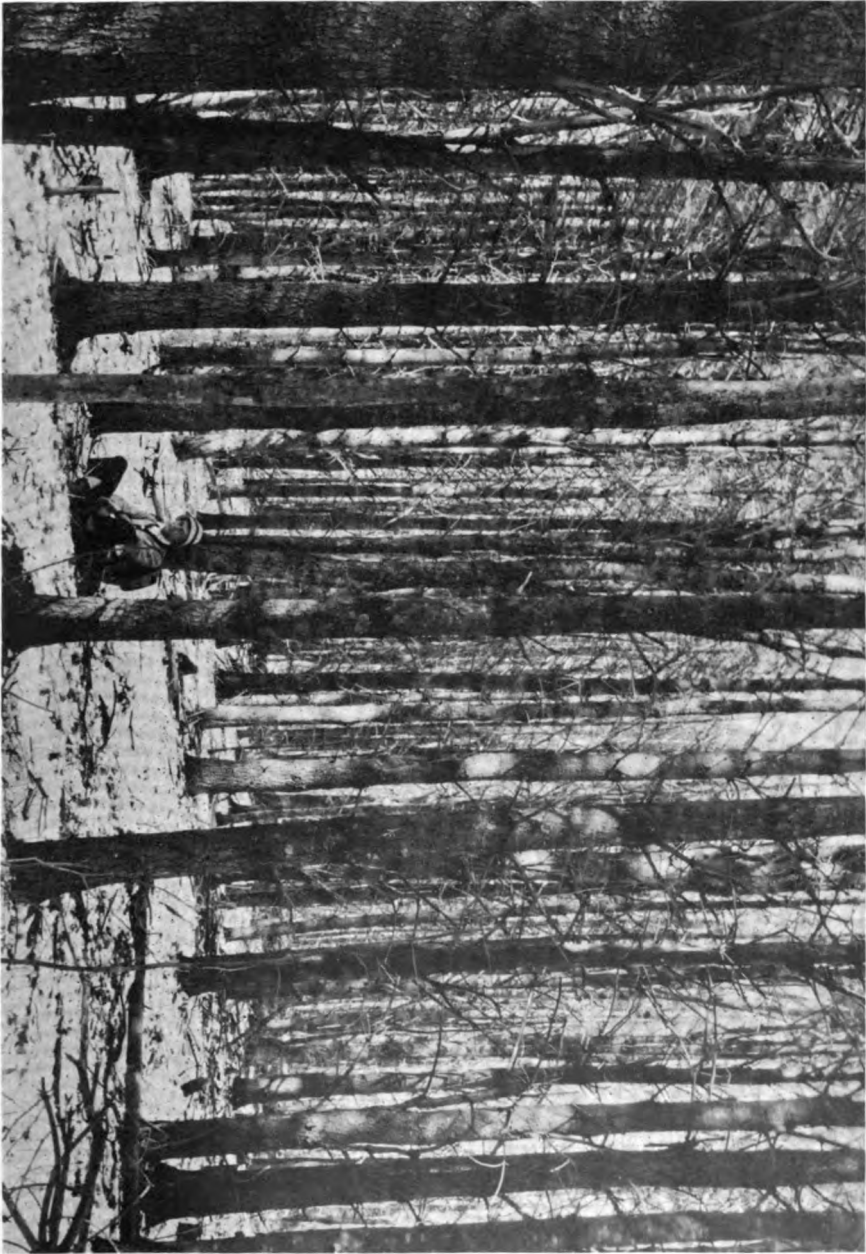
In the words of the Official Register "the primary object in the possession of this forest as part of the equipment of the Division of Forestry, is its use as a field laboratory for the training of students in practical forestry." This forest is particularly valuable as a training ground for students because of the large and varied growing stock and excellent market for practically all species and all kinds of product; and because of the varied distribution of age classes. This facilitates the practice of intensive forestry. It is within two hours' ride of Cambridge and the offices in the Division of Forestry can therefore direct the administration by weekly visits, when not in residence at Petersham. Mr. Fisher feels that the school tract is the strongest single advantage of a professional school of forestry and the school is conducted at the forest from July 1st to December 1st, and from April 1st to June 10th.

EQUIPMENT AND EDUCATIONAL FACILITIES

The equipment includes buildings with bedrooms and recitation rooms, suitable storage space, "and complete set of logging and woods tools," a team used in logging, portable buildings for wood crew, etc.

Such courses as follow can be conducted during the period of field work: identification of species, soil studies, general silvical studies, including marking, planting, and nursery practice, forest management, surveying, engineering, and "forest operations," which include the details of wood management and mill work.

*Petersham, Mass.



EVEN AGED WHITE PINE, 60 YEARS OLD IN THE HARVARD FOREST.



STRIP CUTTING AND MATURE HARDWOODS AND WHITE PINE CLEAR
CUT IN SWALE. ADJACENT POLE STANDS THINNED.

Among the more important species found on the tract are white pine, red spruce and hemlock, popple, paper birch and black birch, white oak, red oak, white ash, black cherry, and red maple.

According to most recent estimates which are, however, approximate, there are at least twelve millions board feet on the 2,000 acres; nine-tenths of this is white pine. The chief woods as regards yield are, besides white pine, chestnut, red maple, red oak, paper birch, white ash and some scattering black cherry which is surprisingly straight and clean boled. The forest is not a woodlot, but a tract producing chiefly saw timber, nine-tenths of which is worth \$7.50 to \$8.00 on the stump; marketing of this timber presents many interesting problems.

The white pine is worth \$7.50 to \$8.00 on the stump, the hardwoods merchantable for saw timber perhaps \$4.00 and the cordwood from saplings too small to be sawn into lumber or from tops sells for 50 cents a cord standing.

There is an excellent market for all species except popple and red maple lumber. There is a considerable quantity of red maple on the tract which is considered more or less of a weed tree since ordinarily it can only be sold for cordwood. The demand for cordwood, however, exceeds the supply that at present can be cut, and no difficulty has been found in disposing of the white pine for boxes, boards, match sash and blind stock, and "square edge." The box and match stock sells for from \$16 to \$18, one inch square edge for \$20, sash and blind stock for from \$25 to \$35. The chestnut sells as inch sidings for \$17, and as 1½ inch round edge for \$20. Selected ash, red oak, and cherry sells in small quantities at fancy prices.

THE METHOD OF SALE

It is rather surprising that Mr. Fisher has found it more profitable to do his own logging rather than to have it done by contract. The only material sold on the stump is a small quantity of cordwood taken out in cleanings. This is sold to local residents in what might be termed "neighborhood sales." In all operations trees are designated for cutting by marking although they are not stamped with any symbol to show whether they were officially marked or not. This is not considered necessary because the officers in charge are so familiar with each tract that they can distinguish if the original marking has been materially departed from. The pine brush is burned at a cost of 15 to 25 cents per thousand. The hardwood brush is usually burned, particularly when it is cut with the pine, but occasionally it is left in small piles where the fire danger is not considered great. Sales are made informally and no formal contract is required.

The results of logging during the fiscal year of 1911 give the following average cost: Sawing, \$1.00 per M.; drawing in and piling, \$1.75, from the piles to rollway at portable mill 20 cents; sawing at mill by contract, \$2.35; "sticking" 75 cents; hauling to the market, \$2.25 (hardwoods hauling to market, \$4.50). Since the thinnings are taken in connection with the final cuttings, no separate figures on the cost of logging have been secured. As an

estimate, however, it is probably true that thinnings cost \$1.15 to fell and saw, while the final cuttings cost but 85 cents. The average sale price for white pine for 1911 was \$17.50. The total cost of delivery, according to the figures secured, amounted to \$8.30. In other words, there was a net profit of \$9.20 per M. feet for white pine. The cordwood sales of white pine tops probably just about balance the cost of cutting and stacking. Even on the poorer quality hardwoods, taking the total cost of delivery to be in the neighborhood of \$10.20, there would still be a net profit of \$3.30 and on the better quality hardwoods from \$9 to \$15 and up according to quality and species.

THE MANAGEMENT OF THE FOREST

Before the Harvard Corporation would agree to the purchase of this tract they wanted definite assurance that it would not be a source of expense to the university. In other words, Mr. Fisher agreed that it would be self-sustaining. The object of the management, therefore, has been (1) to secure a reasonable return, (2) to cut first the timber that was mature and secure immediate regeneration and to make intermediate cuttings to improve the growing stock.

There is at present no working plan, but it is expected that by 1914 a complete working plan will be drawn up. This lapse of seven years between the purchase of the tract and the completion of a formal working plan is accounted for by the fact that only student labor is used in the collection of data and it was desired to be very certain of local conditions and requirements before the management was committed to a definite line of action. At present the tract is mapped for topography, types and a portion for age classes. There is a rough growth table, volume table for white pine based on the mill run and more or less complete volume tables for chestnut and red maple are now being compiled. Tentatively, it is desired to manage the white pine and hardwoods on a rotation of about 60 years, but blocks of rapidly growing pine will be reserved. The actual cut at present has been fixed roughly at 250,000 feet of saw timber (chiefly pine) and 250 cords of wood. The data already collected for the complete working plan indicate that this cut may be greatly increased—possibly even doubled—with absolute safety.

Since there is considerable land either entirely bare or only covered with a scattered growth of gray birch, forestation has been started. About fifteen acres of white pine, two year old seedlings on the better sites and three year old transplants on the unfavorable sites, all spaced 6x6, have been put in.

During 1911 a good many of the white pine seedlings died during the drought and it was definitely determined that in similar exceptional seasons on the less favorable locations only transplants would succeed when planted in the open. Root competition from low brush did surprisingly little damage; in fact, the young trees succeeded better under huckleberry and other bushes than on bare ground. In the large openings the plantations will undoubtedly be successful, but in the small openings with a diameter of 50 to 100 feet,



THIRTY-YEAR-OLD WHITE PINE AND BIRCH BEFORE CLEARING.



THIRTY-YEAR-OLD WHITE PINE AND BIRCH AFTER CLEARING.

it is probable that the surrounding white pine wolf trees will suppress and damage a large proportion of the plantations.

In addition, there is a small area of Scotch pine spaced 6x6. It is planned to try out red pine, red oak, and Douglas fir. Were it not for the excellent reproduction of white ash and black cherry, it is probable that blanks would be planted to these valuable species.

A number of experimental sample plots have been established to secure definite data on the different methods of treatment. For example, where the shelterwood system was tried in almost pure white pine, a quarter acre plot was not cut and nearby a quarter acre was measured to show the results of cutting both as to growth and reproduction.

The value of the Harvard forest as a demonstration of what can be done in practical forestry cannot be over-estimated and private owners would profit by visiting this tract in order to make a careful study of the different cuttings and the results. Within twenty or thirty years, when the results can be more accurately gauged, a tract such as this showing varying conditions, will undoubtedly do a great deal to encourage private owners to cut conservatively.

PROTECTION OF THE TRACT

There is little likelihood of trespass and the tract is so situated that the slightest smoke is at once seen and reported to the officer in charge. Since prompt action can be taken when fires start, no attempts have been made to establish costly fire lines and there is little danger of a crown fire except under most extraordinary conditions and then only in your coniferous growth.

There are ducks, deer, foxes, rabbits and partridges on the tract and the management allows hunting by local residents in order to promote good feeling; the damage by deer, particularly to ash seedlings, is quite noticeable and probably hunting will therefore be encouraged.

At present the 250,000 bd. ft. cut annually, is sold to net well over \$17.50 per thousand, or \$1,875, and the hardwood and pine cordwood for \$300 additional, making roughly a net return of \$2,175. While this land will probably not be taxed since it is part of the equipment for teaching forestry, yet the tract is assessed at \$60,000. The present yield, therefore, amounts to about 3.6 per cent on this low valuation; the tract could be sold for \$80,000 quite readily. Yet it must be borne in mind that the cutting is nowhere near the normal yield. For example, suppose 1,800 acres of the 2,000 were producing to their full capacity on a 60 year rotation. This would mean an annual cut of 30 acres, which surely should yield at least 30,000 feet per acre. If this netted only \$10 per thousand, and it will certainly net more than this, perhaps double, by the time the forest is at its full producing capacity, you would have a net annual revenue of from \$9,000 to \$18,000.

It would be interesting to see the effect of somewhat heavier thinnings in the pure pine 35 to 40 years old, perhaps removing one or two thousand feet per acre additional, or fifteen per cent of the present stand as against

ten or twelve per cent. Of course, there is danger in admitting too much light and thus encouraging undergrowth which would hinder reproduction when the seed felling is made. More sample plots will be established (and it is hoped larger ones) since training in experimental work is part of the curriculum of the school. One would expect at least a preliminary working plan, but the drawing up of such a plan has been delayed for entirely practical reasons and it is doubtful if the management has suffered. Perhaps some of the openings have been too large, but it must be remembered that a large opening possesses a distinct value from an experimental standpoint which more than offsets the small loss through lack of pine reproduction which may result. Whether it would be better to adopt an eighty or hundred year rotation for the pine can only be determined when more complete yield-tables are available.

The popularity of the pheasant, as a game bird and as a valuable assistant to the farmer in keeping down insect pests, is manifested in the state-wide demand for eggs and birds which the New York Conservation Department is sending out from the state game farm. Despite the fact that the department will more than double the number of pheasants and eggs distributed last year, the supply for the present season will not be sufficient to meet the demands.

According to the reports received at the Ogden district office of the Forest Service from various supervisors of the National Forests there will be a shortage of water for irrigation purposes in Utah, Nevada and southern Idaho this summer as a result of a light snowfall in the mountains. In a number of localities, according to the report, the fall of snow has been less than half the normal, as indicated by years past.

By the recent affiliation of the Big Blackfoot Milling Company with the Northern Montana Forestry Association, more than 100,000 acres of timber land owned by the Big Blackfoot within the coöperative territory of the Association has been added, and the Flathead National Forest is preparing to join the Association in the near future.

More than 600,000 feet of timber was cut on the Deer Lodge forest reserve last month, which is much more than the normal production for this time of the year. Most of the timber is from the French gulch district and the indications are that the output of timber in this district for the coming year will be the largest since the inauguration of the conservation project in the several counties that are included in the Deer Lodge reserve.