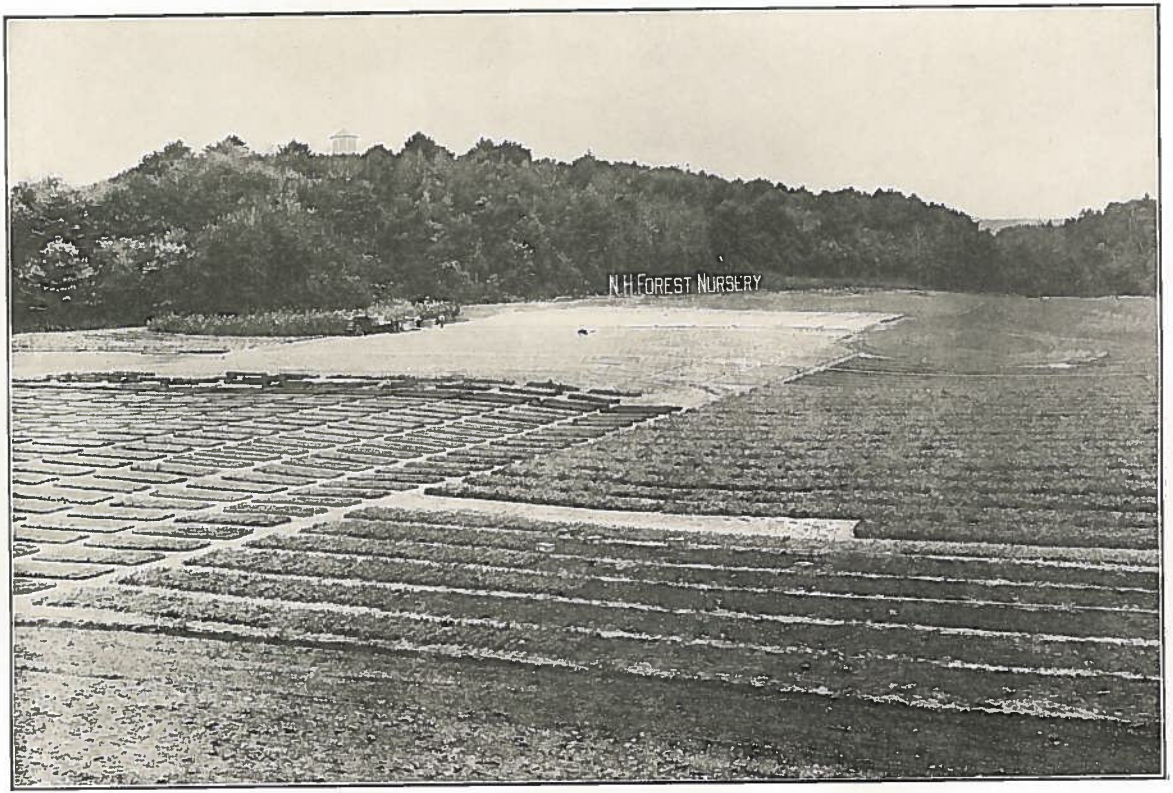

N. H. FOREST NURSERY, BOSCAWEN, N. H.

State of New Hampshire

BIENNIAL REPORT

OF THE

Forestry Commission

For the Two Fiscal Years
Ending June 30, 1926

CONCORD
December, 1926

PRINTED BY
GRANITE STATE PRESS, MANCHESTER, N. H.

BOUND BY
GEORGE G. NEAL, DOVER, N. H.

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REPORT

To His Excellency, the Governor, and the Honorable Council:

The Forestry Commission herewith presents its report for the two fiscal years ending June 30, 1926.

The total land area of New Hampshire is about 5,646,000 acres. After 300 years of settlement during which about 2½ million acres or nearly half the land surface have at one time or another been cleared either for pasture or tillage, we are confronted with the fact that some kind of forest growth now occupies more than three-fourths of the land area. Certainly not more than one million acres are in use for agricultural purposes with the tillage portion probably not more than half this amount. Whatever may be the agricultural possibilities of the future, it is hardly probable that very much forest land will again be cleared under the more modern intensive methods of farming with machinery now coming into use. Making liberal allowance for the areas occupied by villages, cities, highways, railroads and barren lands now estimated at 200,000 acres and for some increase for agricultural purposes it is reasonable to assume that nearly 4½ million acres will forever be useful chiefly for the purpose of growing timber. It is with this area that the work of the Forestry Commission is directed.

Fully one-third of the present forest land area is producing at best only an inferior growth of fuel wood while the balance is in growing or merchantable timber both softwoods and hardwoods capable of sustaining our present forest industries in large measure if rightly managed from now on. Public or semi-public agencies, government, state, towns, institutions and societies already owning about 11 per cent of our forest lands may be expected to control at least 10 per cent more in the future, leaving nearly 80 per

cent owned by private individuals and corporations. At the present time about one million acres are owned by corporations and about three million acres are owned by individuals, half of which are connected with farms. Great as are the possibilities and importance of building up public forests and managing them by forestry methods in the future, there is no doubt but the biggest task ahead in forest management is to maintain productive forests in private ownership.

An analysis of our forest conditions and industries developed during generations of industrial progress in favorable surroundings and from abundant forest resources, reveals at once the intimate relationship of the forests to the welfare of the state. Persistent dangers in the form of outside competition, depreciating local forest values, declining industries and excessive taxation are evident in the face of a well recognized shortage of timber and higher values approaching everywhere in the country. While it should be our desire to have timber production increased and our permanent forest industries built up and stabilized, because timber is the only crop which can be grown on our poor forest soils, these desires are not being fulfilled. The fact is that our forests are steadily being reduced to lower grade timber which cannot compete even in many of our own local markets with the better grades available from a distance. Increasingly high values and ready markets, which our forest owners have enjoyed during the last twenty-five years are not holding up today. The tendency of owners is to cut and sell if possible at any price. This is indicated by the number and variety of portable mills in operation. For the year 1925 there were 163 portable mills registered with the Forestry Department. This increased to 239 in 1926, of which 69 were gasoline mills. Most of them cut scattered lots of low grade box material.

In spite of the number of portable mills, there has been a distinct falling off of home grown timber cut for the local wood industries. From 1923 to 1925, exclusive of the pulpwood business, there was a decrease of 82 million feet in the

cut within the state and an increase of 49 million feet of imported lumber to supply our forest industries. This means an actual falling off of 33 million feet in the amount of business done and an enormous increase in the use of foreign instead of home grown timber.

For the year 1923 the total freight cost for transportation of 163 million feet of lumber and 278,000 cords of pulpwood shipped into New Hampshire, not including the local freight charges within the state, was $2,282,665. A saving in freight of $20 per M. from the West and from $8.05 to $9.25 from the South would be possible if our own forests could supply the grades of lumber in demand. Low stumpage values for high grade timber, together with quantity production, permit these imports for the present to be possible, even with high transportation costs, because we do not have the grades demanded and our stumpage values and operating costs have been much higher. It is not a very encouraging outlook immediately ahead for our owners who have timber to sell and are carrying excessive tax burdens. Most of them would be willing to hold their timber, if moderately taxed, until it becomes large enough to compete with imported lumber, which must inevitably cost more in our market than at the present time. The situation, however, is not so discouraging to those who are beginning to build up productive forests for the distant future. Impossible as it is to foresee timber values fifty years hence, the prophesy is as reasonable as any can be that timber will then be sufficiently costly to warrant growing it as a crop under the present classification law or some other fair system of taxation of wider application and different from the general property tax. The most serious situation confronts the owner of half grown or nearly merchantable timber, burdened with taxes while the timber is yielding him nothing and seeing his markets immediately ahead crowded by imports from a distance.

The present application of the general property tax to growing timber in the organized towns of the state is caus-

ing premature cutting and lack of interest in future timber production. Unless the private owner can produce timber of larger sizes, unless he is encouraged to save young trees in cutting, improve his woods by thinning and pruning and to plant the unproductive areas, we may expect our forests, except those in public ownership, to steadily depreciate in the size and quality of the trees and our industries to decline accordingly.

The public has a direct responsibility to make timber growing attractive to forest land owners by a fair and reasonable system of taxing growing forests, by protection from forest fires, insects and diseases, by furnishing trees for planting at the lowest possible cost, and by offering assistance and advice in the care and management of woodlands and the marketing of forest products. Progress is being made in all these lines of effort and New Hampshire stands fairly high among other states in matters of forest protection, distribution of planting stock and in educational effort. On the other hand, these constructive programs are offset by the penalizing effect of taxing immature forests year after year as general property at high valuation. It has been repeatedly shown and most timber growers know that the present system of taxation rigidly enforced makes it impossible to grow timber much longer than forty years without actual financial loss. The market needs older timber and small trees are selling, if not with increasing difficulty, certainly at lowering prices.

Under the present classification law there is an encouragement to the woodlot owner to build up a small forest from the beginning, with the confidence that taxes will not during the intervening years take away the profits resulting from his efforts. It is doubtful, however, if classification will prove to be sufficiently attractive to the rank and file of forest land owners as to come into general use in such a way as to solve the vexing problem of taxation of woodlands. For the years 1924 and 1925 the county records show 74 lots classified aggregating 2816 acres in 37 different towns.

Relief to be widely effective must apply automatically to all woodlands and is closely dependent on a reform of the fundamental property tax law of the state. Difficult as such a change appears, the results would undoubtedly be to give incentive to the forest land owners everywhere within our organized towns to look forward with real interest to the development of better timber crops on their land. Once the owners are relieved of the high annual tax levy and look upon their growing timber as a periodic crop, there will be every inducement for them to save the smaller trees of doubtful profit in the present market but of great importance to their future land value.

In forest fire protective work we now have a fairly authentic record of seventeen years effort, a summary of which is included with this report. The average number of fires annually during this period, exclusive of railroad fires, was 341, the average area burned was 9645 acres, and the average damage was $76,174. The averages of the past two fiscal years show a larger number of fires and greater damage but a considerable decrease in the acreage burned. One fire in 1925 and four fires in 1926 were responsible for much of the damage during the two year period. Three of these four fires started May 8, 1926, a record breaking day of high temperature and high wind. Experience with these and many other fires reveals the rapidity with which they may spread under certain weather conditions which often are of very short duration. One fire of May 8 in Hudson and Pelham covered five square miles in a few hours and destroyed $70,000 worth of standing timber, buildings and lumber. The expense of extinguishing fifty-seven illegally set fires was paid by the persons responsible. Many other cases were taken to court where the evidence seemed to be sufficient. There is great need of unabating effort to control burning, educate the public to the importance of preventing fires from starting, quick reporting of fires to the wardens and speed in reaching fires and bringing them under control with sufficient help and proper fire fighting equipment.

While larger towns are improving their general fire fighting equipment and adding motor pumps and chemical tanks and the Forestry Department has during the years past helped many towns to buy certain forest fire tools, a recent survey of fire fighting equipment shows there are 75 towns in the state having no fire equipment whatever.

During the past season the Forestry Department maintained 24 fire lookout stations. The Chocorua station on Government land has been turned over to National Forest administration and Rosebrook was not operated. Replacement of open top wooden towers built years ago for enclosed towers has progressed by the use of federal co-operative fire funds so that of the 24 stations the state now operates, fourteen have steel towers and enclosed tops, three have wooden towers and enclosed tops, three have enclosed cabins or observation rooms on bare summits and only four stations have wooden towers with open platforms. One of these, Magalloway, will be replaced next spring by a new wooden tower with enclosed top and a new station will be built on Red Hill in Moultonboro to replace the Mount Israel station of the old type. Funds for the building of the new steel tower and a cabin on Red Hill have been generously donated by Mr. Ernest B. Dane of Boston and Center Harbor. The two other stations with open platforms, Carrigain and Stinson, will have to be rebuilt if they are to be maintained as efficient stations. The watchmen detected and reported 1295 incipient fires or brush burning smokes to the wardens for investigation during the past two seasons. About 50,000 people visited the fire lookout stations.

Since 1918 a total of 179 towns have raised funds for the control of the blister rust disease and in 42 of them all the pine areas have been covered the first time. The total area on which all currant and gooseberry bushes have been removed amounts to 1,757,964 acres.

In 1925 the number of towns and cities appropriating was 78 and the amount raised by them was $32,725. In 1926 there were 81 towns and cities raising $33,375. The total

area covered for the first time amounted to 397,652 acres for the two years. In addition five towns in 1925 and nine towns in 1926 raised funds for the re-eradication of about 74,000 acres, some years having elapsed since they were covered the first time. There were also 49 private co-operators who contributed $4800 for work on their own land. The Forestry Department paid the cost of covering fourteen State Forests and the Government for covering various scattered pine areas on the National Forest. Careful checking by State inspectors of eradication work in 64 towns of the 81 in which crews were employed indicated that over 98 per cent of all the currant and gooseberry bushes were removed by the crews.

The spread of the blister rust disease is arrested wherever eradication work has been done. This is shown by the fact that new infections are not found after an area has been completed. On the other hand the disease is steadily spreading in sections where no eradication work has been done. The season of 1925 like that of 1918 was extremely favorable to the spread of the disease on account of prevailing moisture conditions.

Concerning the towns not yet completed, there are many where the work is so well underway that one or two years more will see them finished for the first time. There are, however, 37 towns which have never appropriated funds for control work, although in 19 of them some work has been done through co-operation with private owners. In most of the 37 towns there are extensive and valuable pine areas where the disease is gaining headway and control measures are greatly needed. The fact too often lost sight of and which should cause more concern is that the blister rust disease rapidly kills off pine seedlings and small trees with the result that in most areas of infection there is a marked absence of pine reproduction. It is decidedly necessary to the future welfare of every pine growing town, as well as the State, to carry on the work of control until completed. While the disease will undoubtedly always be with us and

periodic inspections and re-eradication of given areas will be necessary, the most important objective is the completion for the first time of the pine sections of all towns. It is to this end that the Forestry Department is directing its efforts.

Two years ago the Forestry Department was making a supreme effort to build up its State Nursery for a much increased output of trees to supply the demands for planting stock. An adequate water supply and larger areas of land put in condition and suitable for nursery and transplant beds were the first essentials well under way at the beginning of the present biennial period. It was necessary to divert funds for state lands and state land planting to the nursery during the spring of 1925 in order to accomplish these results. The Legislature of 1925, by appropriating for the nursery on the basis of a budget showing in detail the needs of the nursery for the two years, made it possible for the Department to carry forward the program of increased nursery production, the results of which to date are subsequently shown. This program covering a four-year period to 1927 contemplated an output of 2,975,000 trees for the last three years of this period, a stock on hand in 1927 amounting to 7,500,000 trees and a return to the State Treasury of $4825 in 1925, of $4675 in 1926; and of $9625 in 1927 from the sale of trees beyond the 250,000 trees to be planted on state land in 1926 and in 1927. The amounts appropriated for the nursery, except that proportion representing the cost of trees to be used on state land, are in the nature of an advance to be returned to the State Treasury when the trees are sold.

The program to date has worked out better than was anticipated. While the actual return to the State Treasury for the fiscal year 1924-25 was slightly below the budget program, the return for the last fiscal year 1925-26 was enough higher so that the average return for the two fiscal years was $536.89 more than was anticipated for these two years. The number of trees sold was 1,746,000 and the actual money return to the State Treasury from the sale of nursery stock was $10,036.89.

With the expansion of the nursery and with improved facilities for growing trees, the cost per thousand has decreased the first year but increased the last because of the higher price and poorer quality of the seed. The law requires that trees be sold at cost. As the price for trees changes accordingly from one year to another, it can never be possible to make the actual return to the Treasury agree with the budget. For the year 1926-27, the price of four year transplants has been fixed at $7.75 and three year transplants at $6.25 per M. the increased cost of seed offsetting the lower cost of production during the present year. Nevertheless, the returns to the State Treasury next year will probably not fall far short of the $9625 in the budget program of two years ago.

The seed situation is acute; not only is the quality poor and the price high but it is impossible to be assured of sufficient quantity to take care of the requirements from one year to another. Some attempt is being made by the U. S. Forest Service to help the various states secure the seed they need but it is still necessary to depend on a few private collection agencies in different parts of the country and even to buy seed from abroad. Local supplies are too intermittent and the means of collecting the seed too difficult to be depended on.

The demand for trees for private planting continues unabated and can easily be increased as more trees become available. New sources of demand for trees are the towns themselves for planting areas set aside as town forests and the increasing numbers of boys and girls being organized in forestry practice under the Extension Service of the State University. It is probable that a change in the program of nursery production for the next four years, and possibly for next year, to provide for free trees to municipalities will prove desirable. The law already permits trees to be so given, but to do so, naturally reduces the returns to the State Treasury from sales and seriously interferes with the pro-

gram unless given due consideration with the sanction of the Legislature.

While it was necessary to curtail planting on state land for a few years previous to 1925, the program was considerably increased the fall of 1925 and the spring of 1926. A total of 251,750 pine and spruce trees were set on 338 acres in nine different state forests and two reforestation tracts during these two planting periods.

The development of public forests, particularly town owned forests, is meeting with general approval in New Hampshire but we cannot expect to draw upon state and town funds for this purpose in anything like the degree that is being done in some of the eastern states. The federal government is steadily increasing the acreage in the White Mountain National Forest which on June 30, 1926 contained 431,846 acres, all but 32,892 acres in Maine being in our state.

The total area of state forests is now 21,283 acres in addition to five small reforestation tracts aggregating 98 acres which have not been taken back by their donors, as permitted by law. During the last biennial period only 740 acres were added, partly because it became necessary to divert some of the funds to the State Nursery, by approval of the Governor and Council, and partly because an important prospective purchase failed of completion at the close of the last fiscal year, $1500 reverted to the General Treasury. All except one of the purchases were additions to existing State Forests and 95 of the 740 acres were gifts to the state.

The last Legislature appropriated $200,000 for the purchase of Franconia Notch. The great amount of interest shown by both House and Senate clearly indicated that the people of New Hampshire are anxious to save this famous section from any forest devastation. Although no title has passed, the Governor and Council have made progress in this important acquisition.

The total area of town forests reported two years ago was

8,663 acres. We now have authentic record of 11,643 acres of forest land owned by the towns. There is a rapidly growing town interest in bringing to light forgotten areas owned by the towns, as well as in acquiring new areas and planting them where necessary. Already 1,357,000 trees have been planted to date on town owned land.

All matters relating to the welfare of our forests have for many years received earnest consideration by the people of New Hampshire. This is shown not only in the legislature but in the majority of town meetings. It is evident from the willing co-operation of individuals and concerns in carrying out the forest laws and the friendly attitude of the Grange, the Farm Bureau organization, Federation of Women's Clubs, Lumbermen's Association, and others within the state. It is reflected in frequent and generous gifts to the cause of forestry one way and another within the state and the willing service rendered to the towns and state by our hundreds of wardens and deputies for which no adequate compensation is received. The slowly growing interest of those land owners who are improving their own forest holdings in spite of taxation handicaps arises out of a knowledge of the importance of having productive forests in the future as in the past and the practicability in the long run of the measures recommended to this end.

Education has long been recognized as an important factor in promoting interest in forestry. During recent years education has come more to mean personal contacts with land owners or groups in the woods where the various problems can best be considered. We owe much to the several co-operating agencies of the Federal Government which in every instance confines its forestry activities to the educational field, leaving to the state, as should be, the task of administration and working out of details. By such co-operation we have the benefit of funds to employ our agents in blister rust control and an Extension Forester at the State University as well as assistance in the prevention of forest fires and in tree distribution. Education enters into all these

administrative activities and as results are more and more apparent, there comes a realization of less need for further restrictive legislation.

Full and detailed information in relation to the various activities of the Forestry Department during the last biennial period are contained in the body of this report. There is also an appendix in which it has seemed proper to publish an excellent paper entitled "Impressions of European Forestry" by former State Forester Edgar C. Hirst; also a list of the wood using industries, stationery mills and principal lumber dealers by counties and a list of the operators of portable saw mills registered in 1925 and 1926. Legislative remedies to solve present problems and as a guarantee of further progress are not necessarily effective or wise. Our forest laws are the result of at least seventeen years study and experience and in the main are satisfactory. Changes can be made in the forest fire laws which would doubtless result in better control of careless and illegal burning and a saving in town and state fire fighting costs. Just how these changes can best be worked out is not entirely clear. The problem of forest taxation should engage the best legal and business talent in the state and is one which extends beyond the field of forestry alone. As already pointed out there is a clear cut responsibility resting upon the public to make timber growing a reasonable undertaking for the private land owner. Beyond this, economic conditions of supply and demand should determine how far and how rapidly private forestry practice will progress.

The budget, submitted in October, as required by law, has been carefully prepared to show the cost of conducting the work of the Forestry Department for the next biennial period. The only additions to the budget of two years ago are to take care of the salary increases established by law; to carry out the program of increased nursery production, the returns from which revert to the General Treasury; and to help towns in securing much needed fire fighting tools.

Unused balances, mostly from a saving in fire fighting, purchase of land and blister rust control and amounting to about $8000 the past two fiscal years, have been allowed to revert to the General Treasury.

For many years the sum of $5000 annually has been appropriated for the purchase and improvement of state lands. Nearly 16,000 acres have thus been acquired in addition to over 5500 acres coming to the state as gifts. The tendency to use the funds available for purchase rather than for improvement work is natural and generally desirable. Cordwood cutting, thinning or the sale of logs involve expenditures for labor and other charges and whatever returns may result from such work must now revert to the general treasury by law. Expenditures made one fiscal year may not bring returns until the next and returns may be only in improved forest growth. Yet the funds to do improvement work, come from an appropriation, the underlying purpose of which is to purchase land. There is not sufficient incentive to carry on small cutting operations which necessarily involve expense unless there is a special fund in the general treasury to take care of them. From whatever point of view the development and management of state lands is examined, it seems desirable to permit of a continuous State Land Fund in the treasury into which all income from state lands shall be deposited and used out again upon the warrant of the Governor for further state land improvement. Income in rentals and sale of products from state lands has been slowly increasing and for the last two years amounted to some over $3700. At some future time the income will take care of the state lands and provide for additional purchases. It does not seem too early to put the plan into operation. Otherwise the appropriation for state lands will have to be considerably increased in the near future if any

amount of general improvement work aside from planting is to be done.

Respectfully submitted,

W. R. BROWN,
JOSEPH B. MURDOCK,
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Forestry Commission.

JOHN H. FOSTER, *State Forester.*

ANALYSIS OF OUR NEEDS IN TIMBER PRODUCTION

The settlers early distinguished favorable lands for farming and placed little value on rough slopes other than for pasture. By 1730 there had been much clearing of land to the south but only for rough log homes and the timber was for the most part destroyed. During the years after the close of the French and Indian War in 1763, enormous areas became cleared as town after town was divided into lots and sold by the proprietors. The advent of water power mills opened up a market for lumber and the white pines came into rapid use both locally and for export to the coast cities. River driving was practiced extensively. Between 1850 and 1860 agriculture had advanced to such a degree that the greater part of southern and central New Hampshire outside of the White Mountain lands had been cleared either for cultivation or pasture. Estimates at that time indicate that about three million acres of land were cleared. The White Mountain region and northern New Hampshire, as well as scattered areas in other parts of the state, remained for the most part in virgin forest condition up to that time. It was not until the advent of the steam mill that lumbering in isolated districts became anything more than a selection of trees for special use. As late as 1870 records show that incorporated towns surrounding the White Mountains were from one-half to two-thirds covered with virgin forests and as late as 1902 the Forestry Commission reported 700,000 to 750,000 acres of virgin timber in the three northern counties. The unincorporated towns belonging to the state were sold by acts of the legislature from about 1805 to as late as 1867.

From about 1870 to 1907 the spruce forests of the northern and mountain sections were rapidly cut by means of logging railroads and large saw mill plants. From 1907

the industry began its decline to the present time. In the meantime vast areas of farm lands cleared before 1860 were abandoned and returned to white pine furnishing land owners twenty-five years ago with a small but satisfying income from the sale of logs. The timber at first was not cut clean and the land was not denuded. A new industry from the second growth pine forests developed when the portable steam mills came into general use with timber in the hands of lumber operators and clear cutting the practice. During the past twenty-five years the cutting of second growth white pine has become one of the biggest industries in New Hampshire. Hardwoods in the mountains and the north country have not been as yet extensively lumbered and future activities are likely to be directed to the hardwood industry. The remaining softwoods, spruce and fir, not more than a few thousand acres being of old growth, supply in small part the pulp needed for the large paper mills of northern New Hampshire.

There is little resemblance in the forests of today to those which the early settlers found. Farm lands abandoned and grown up to white pine have been again cut over. Still other forests in southern New Hampshire have been cut over time and again first for fuel for locomotives, charcoal and for lumber, where market conditions were favorable. A variety of forest conditions now prevails, the principal characteristic being mixed species of immature growth and large areas of brushy sprout growth of low fuel wood value only. In the northern forests some of the virgin character still remains because of the large amount of hardwoods never lumbered. The valuable spruce and fir have mostly disappeared over large areas but in other places is returning in second growth. Where hardwood lumbering has taken place on the stronger soils all hardwoods are more likely to be of future value and spruce occurs in mixture instead of pine. Left alone for a century or more our forests would again restore themselves to something of their former condition. It would

seem that the problem before us is to build up unproductive land into forest types which promise to be needed in the future. Those which show the possibility of restoration by natural means need mostly to be protected and left alone. Many need planting while still other areas need to be improved by thinning and the cutting of hardwoods.

Division Into Areas.

Land areas in New Hampshire are not yet accurately known but the completion of the topographic maps by the U. S. Geological Survey now being undertaken will make a close determination of land areas possible. The U. S. Census Bureau has estimated the total area to be 5,779,840 acres. According to the New Hampshire Agricultural Census there are 2,603,806 acres of land in farms. Of this 1,299,838 acres or 50 per cent are in woodland of which some over 427,000 acres are represented as merchantable and 601,066 are unimproved and non-forested. Only 702,902 acres are given as improved. The Forestry Department in preparing its material on forest resources for publication two years ago reports the total land area to be 5,646,051 acres, and the water area 196,030 acres. Table I reprinted from that report shows the division of the state into area of merchantable timber, young growth, light producing land, agricultural land, water area and land thrown out of use because either barren or used for highways, towns, etc.

TABLE 1.

FORESTRY ANALYSIS OF OUR NEEDS.

NEW HAMPSHIRE AREAS.

	Total Land Acres.	Area of Merchantable Timber.	Area of Young Growth.	Area of Light Producing Lands.	Area of Agricultural Lands.	Area of Barren Lands, R. R., Highways, Towns, Rock, Swamps, Burns.
Belknap	254,680	14,464	52,100	114,734	62,662	10,720
Carroll	588,322	145,191	175,403	174,241	74,484	19,003
Cheshire	447,013	52,705	126,431	158,606	92,265	17,006
Coos	1,150,889	404,284	479,385	162,603	85,478	19,139
Grafton	1,079,164	243,760	264,798	332,368	205,505	32,733
Hillsboro	552,385	36,642	178,167	186,915	117,679	32,982
Merrimack	577,858	51,638	172,986	216,337	116,869	20,028
Rockingham	426,522	21,680	101,971	152,951	120,308	29,612
Strafford	242,308	10,911	46,488	103,576	69,056	12,277
Sullivan	326,910	31,478	100,736	121,244	64,279	9,173
Total	5,646,051	1,012,753	1,698,465	1,723,575	1,008,585	202,673

A careful study of the various land divisions by counties is of interest. It is clearly shown for example that the three northern counties, Coos, Grafton and Carroll, contain a much larger percentage of the merchantable timber and young growth land. The southern counties on the other hand, carry the larger percentage of light producing timberland, agricultural land and barren land. Nearly one and three-fourths million acres of light producing land are a drag on their owners and make the towns and state poorer instead of richer.

Ownership of Timberlands.

The total forested area of New Hampshire is approximately 4,434,793 acres of which 11 per cent is owned by the Federal Government, state, towns, societies and public institutions, about 21 per cent is owned by corporations and about 68 per cent owned by individuals. About half of the forest lands owned by individuals are farm forests while the other half is owned by lumbermen as well as other persons in towns and cities both within and outside the state not connected with agriculture or lumbering. There is a tendency to accumulate forest land by those who have the desire to build up country estates of considerable areas and on a smaller scale by townspeople, business and professional men who hold woodlots in neighboring towns partly for the joy of ownership but nearly always with some idea also of the investment value for their children or their future estates and where immediate returns are not in the least considered. Individuals and corporations connected with the manufacture of lumber or forest products are of course the natural classes of owners holding forest land for investment purposes. It is true however that many private owners not connected with the timber business together with the various agencies of public ownership are doing more today to improve and build up forest properties than are the persons and corporations who would seem to be most concerned. Business interests are

more likely to ask how growth compares with interest returns elsewhere, risk, taxes, insurance, etc., and some of these questions are extremely difficult to answer. Development in the future must be slow but will inevitably take place following supply and demand, increase in prices, improved markets and the higher cost of imported lumber.

Land and Stumpage Values.

The value of any particular timberlot depends on the quantity and quality of species growing thereon, its accessibility for logging and nearness to market. It necessarily varies greatly from any general values for the state or a region. Stumpage value means the market price of lumber or wood minus the operating expenses and profit. In order to determine stumpage value it is therefore necessary to know what prices will be obtained for lumber, the cost of various operations from stump to selling point and the percentage of profit to be deducted.

According to our forest resource investigations, bare land chiefly valuable for the production of timber was considered to be worth $4 per acre on the average. Merchantable softwood stumpage was placed at $9 per M, hardwoods at $3 per M and cordwood at $0.50 per cord. The following forest valuation for New Hampshire on this basis may be of interest:

1,012,753 acres of land and merchantable timber	$56,770,418
1,698,465 acres young growth land and timber	27,955,055
1,723,575 acres light producing land and cordwood	10,341,454
Total	$95,066,927

Since these results were determined two or more years ago there have been changes up and down, the most noticeable being a reduction in prices of low grade pine. The figures

still serve to give an approximate index of our forest land values for the state as a whole.

What Our Forests Are Now Growing.

While individual acres or woodlots under careful management can be made to yield relatively high returns annually, figures given for the entire state or a region to show natural increase in growth are low. It is estimated that the average annual growth of white pine is but 226 board feet per acre; other softwoods principally spruce 123 board feet per acre; hardwoods 90 board feet per acre. They appear extremely conservative when compared with the known yield of from 500 to 1000 board feet annually from thrifty second growth white pine and the commonly known yield of one cord per acre annually from hardwoods under proper conditions. Based upon the figures given above the annual growth of timber in New Hampshire is estimated to be 360 million board feet.

Requirements of the State.

The annual lumber and pulp wood consumption exclusive of fuel wood reported two years ago was 777 million feet. Of this amount the annual cut within the state was 460 million feet of which 38 per cent is pine, 54 per cent other softwoods, principally spruce in the form of wood pulp, and only 8 per cent hardwoods. The manufacturers and consumers imported from outside the state about 317 million feet annually of which 48 per cent is spruce for paper and the balance lumber mostly from the South and West.

It is clearly seen that the cut within the state is 100 million feet more than the annual growth and the annual consumption exceeds the cut by 317 million feet which is imported. There is exported each year from the state about 316 million feet of lumber and 30 million feet in pulpwood making a total of 346 million feet. If we consider only the requirements in timber for use within the

state, 431 million feet, our annual growth of 360 million, together with quality and special use timber which must of necessity be imported, will be sufficient to take care of our own needs. However, it should be our purpose to maintain our forest industries, increase them if possible, and promote the business of lumber production because it is the only business whose raw material can be grown on our poor forest land soils. Therefore we should not only take care of our local requirements but produce lumber for export in increasing quantities to help supply the needs of industry in our neighboring states. This will undoubtedly be possible when imported lumber from the South and West reaches higher price levels in the New England market and we have the timber of suitable size and grade to meet reasonable requirements. To continue to maintain our present cut it is necessary to either increase the yearly growth on the areas now producing timber or greatly increase the forest producing areas. Both can be brought about by means of planting and forest improvement.

Perhaps the most serious aspect of our requirements for timber lies in the fact that we are making heavier inroads from the supply of spruce for paper making than from the pine which appears to be more nearly taking care of its own. There is less chance for spruce to reproduce in competition with northern hardwoods and on account of its slow growth and great demand, this species is playing a losing game which may ultimately result in its disappearance as a product for paper making in this state.

Forest Industries.

The lumber business in New Hampshire developed from small beginnings which did not assume large proportions until after 1870. The value of lumber products doubled from 1870 to 1900 and multiplied eight times from 1870 to 1907. The census of 1880 showed a cut of 292 million feet which increased to 754 million in 1907. There was, however, a decrease in the number of forest industries due

to abandonment of many water mills and the combination of smaller units into larger ones. This was the peak year of lumber production. During this period lumbering was the principle industry in scores of communities principally in the White Mountain region. From 1907 there was a fairly steady decline to the present time. In 1903 there were 65 saw mills in the White Mountains, 52 of which were cutting spruce. The cut in 1880 was largely spruce which rapidly declined after 1909 while the cut of pine exceeded the cut of spruce for the whole state after 1900 and since that time has been the principle lumber produced. The rapid cut of pine came about when second growth pine on lands abandoned for farming following 1850 to 1860 first became marketable. The box board industry has furnished the principle market for this second growth pine until the present time. The falling off of the spruce lumber cut came about as spruce timber became more inaccessible and more valuable as pulpwood in the paper industry than for lumber.

There were 92 stationary saw mills listed in the State in 1925, many of which are water mills sawing only during the high water period in the Spring. In addition there were 31 permanent saw mills listed in connection with the manufacture of various forest products other than lumber. There are very few permanent mills sawing lumber alone which operate throughout the year. A host of portable mills however has come into use for logging second growth pine and hardwoods. The number of these mills registered with the Forestry Department for 1925 was 163, of which 116 were steam and 47 gasoline. For 1926 the number increased to 239, of which 170 were steam and 69 were gasoline. The number of gasoline mills appears to be steadily increasing and it is possible that they may almost entirely supersede the steam portable mill in time and really become a part of the farm and forest equipment of many small private land owners.

In 1923 there were about 225 wood using industries, ex-

cept those using wood pulp, consuming about 445 million feet of lumber, 282 million of which was cut in the state. About one-third of the raw material was imported. Two-thirds of the plants were located in southern New Hampshire and half of the products were made from pine. For the year 1925 the Forestry Department, in accordance with Chapter 191, Section 63 of the Public Laws, obtained the lumber cut from the owners and operators of stumpage, the results for the calendar year showing that 248 million feet were cut in the state. For the same year Mr. A. C. Cline reported the total lumber used by New Hampshire industries as about 412 million, 200 million of which was cut in the state.* This 200 million does not include the logs shipped out of the state for manufacture or the lumber cut by portables and shipped out.

The results of 1925 estimates indicate a decrease in the amount used by the industries of 33 million feet, a decrease in the New Hampshire cut to supply these industries of 82 million feet, but an increase in the use of imported lumber amounting to 49 million feet. There is, according to Cline's report, a falling off of 30 to 50 per cent in the use of pine boxes as containers, which is mainly bringing the box industry back to pre-war conditions. He recognizes the reduction taking place in the average grade of native lumber and competition from the South and West, and emphasizes among other things the importance of cutting larger, older timber, accurate sawing and careful seasoning, sawing to grade, and more systematic efforts to selling.

Like lumber the pulp industry has had its rise and fall. In 1916 the maximum consumption in New Hampshire was 752,232 cords of pulpwood of which 402,744 was cut in the state. In 1921, 459,691 cords were consumed in the state of which 191,838 cords were cut in the state. This falling off was undoubtedly due to the scarcity of pulpwood in

* The Marketing of Lumber in New Hampshire, 1925, Harvard Forest Bulletin No. 10.

New Hampshire and the tendency for the paper industry to concentrate in Canada especially for news print paper production and to specialize in other pulp and paper products in their mills remaining in this state.

There is a wide variety of wooden products and novelties much in demand today. An examination of the industries using wood in the various New England states is both interesting and enlightening. New Hampshire does not yet begin to make use of its possibilities in the direction of manufacturing wooden articles. The development of the wood industry business is important because it makes a wide variety of woods marketable and creates industrial prosperity in rural communities which would otherwise have little to do. We should strive to increase the number of our small wood using plants especially those using hardwoods and encourage every manufacturer of boxes to develop such other forms of container as the market can take care of, the raw material for which is generally available nearby, and if possible without losing the trade formerly enjoyed.

Importation of Lumber and Pulp.

For the year 1923 the Forestry Department made a special study of the amounts and sources of imported lumber and pulp and the freight charges paid on them both inside and outside the state. This study was made possible only by the laborious task of examining the freight records in detail of all the railroads in New Hampshire. A striking feature is that 70 million feet of lumber from the South and West were brought into New Hampshire in one year and the cost for freight over the local cost was over $800,000. The cost of freight on 40 million of lumber from Canada was $70,000 and the freight charge on 278,225 cords of pulpwood from Canada amounted to the enormous sum of $1,391,125. The total freight cost for transportation outside of New Hampshire for one year was $2,282,665.

A saving in freight of $20 per M from the West and

from $8.05 to $9.25 from the South could be brought about if the same timber to supply our needs could be grown at home. This is indeed an argument to place idle forest lands to work producing pulp and lumber in order that we may benefit from the saving in freight costs if for no other reason. Every available agency should be encouraged to produce more timber in New Hampshire for future consumption thus stimulating business and industry and offering greater prosperity to those living in rural communities. The present mean annual growth of 226 board feet per acre for pine, 123 for spruce and 90 feet for hardwoods can be doubled in our present woodlands and still without practicing more than what might be termed crude forestry. Intensive culture of our forest producing areas could increase our annual growth four times. To increase the yield of present forests we must further reduce fires and fire hazards, cut the merchantable timber in a manner to secure good reproduction of desirable species and save small trees, practice improvement and release cuttings in young growth and thicken up partially stocked areas wherever possible by natural reproduction or else by planting. Improvement of light producing areas can only be brought about by planting as a rule.

All these considerations require time and further education and the will to take the necessary steps. Whatever yield can be built up in the future beyond the present needs of the state can undoubtedly be taken care of in the great industrial centers of the East which are our markets. Only the pressure of supply and demand will probably start our land owners firmly in the direction of systematic timber production. Education, demonstration, more intensive protection, tax adjustment and further research in forest problems are greatly needed in order to bring our people to understand the existing public necessity of growing more timber and the opportunity open to the land owner who is willing to do so.

National Aspects.

Nearly half the land area of the United States, or about 822 million acres, was originally forested. It is estimated that 5200 billion feet of timber covered our land when the first settlers came. The amount of virgin timber has been reduced below 1600 billion feet, 75 per cent of which is west of the great plains. More than half of all the saw timber in the United States, virgin and second growth, is in the three Pacific Coast States. There are 250 million acres of cut over land and 81 million acres of it are entirely unproductive. Half the total consumption of timber is East of the Mississippi River and north of the Ohio and Potomac Rivers. Consumers spend over $250,000,000 annually in freight charges for lumber transportation.

The first lumbering was along the Atlantic Coast from Maine to the Carolinas. As the cut of virgin white pine neared its end along the Atlantic seaboard and in Pennsylvania about 1850, exploitation of the splendid white pine forests in Michigan and the other Lake States began. Lumbering of hardwoods also began in the more accessible portions of the southern Appalachian Mountains. As the Lake States pine became scarce in 1890 to 1900 there began a rapid transfer of lumber activities to the great long leaf pine belt in the South extending from Virginia to Texas. This great storehouse of merchantable timber is now four-fifths exhausted and the lumber industry has again moved to the northern Rockies and the Pacific Coast States where the last stronghold of timber remains. The northeastern states were the center of lumbering activities during the first half of the last century during which time our agricultural and commercial development took place. Pennsylvania was first in the production of lumber in 1860 and the Lake States with Michigan leading occupied the center of forest activities until 1900. The South has been the center of lumbering to 1920 but is now being rapidly superseded by Washington and the north Pacific States. White pine was the principal lumber cut in the early days, in fact until

about 1900, when southern yellow pine became the leading species cut. White pine today occupies sixth place while southern pine has now relinquished first place to the Pacific Coast fir. For 30 years, 1870 to 1900, Michigan was first in the production of white pine. It now occupies ninth place with Minnosota and Idaho leading and Maine and New Hampshire taking third and fourth places. It is interesting to note in this connection that Maine, New Hampshire and Massachusetts cut more white pine today from their small second growth forests than Michigan and Wisconsin which for 30 years led the country in lumber production of white pine. The year 1907 was the climax year in the production of lumber for the whole country. By 1920 there was a greatly decreased production in the face of the highest values ever known and greater needs than ever existed before. As a matter of fact there has been a steady increase in production in eleven western states but in only one eastern state since 1919. For the country as a whole the production has decreased on an average of two per cent yearly while the price has increased on an average of five per cent yearly from 1899 to 1920.

With lumber production rapidly being concentrated in the Northwest, it is an interesting fact that the western states have become large consumers. California, for example, has doubled its consumption in three years and now exceeds Illinois, New York or Pennsylvania which are its nearest competitors. Two-thirds of its supply of timber is taken from Washington and Oregon and only one-third from its own forests. The three Pacific Coast states use or export to foreign lands two-thirds of their production and ship the remaining third to the central and eastern states. The southern states have never used any important part of their enormous production in the past but have shipped it almost entirely to northern markets. The South is expanding rapidly and with the shrinkage in cut will not long be able to supply other sections as in the past. Of the vast quantities of timber originally found in the Pacific

Coast forests, fully one-half has already been cut or burned. There are still standing probably 1100 billion feet but this is no more than the South had in its yellow pine forests in 1895. One-half of it is in mountainous territory and one-third protected from devastation by being in National Forest thus causing the timber to be either inaccessible and therefore costly except for local use or else not fit for lumber or more valuable for protection purposes. Not more than one-third of the remaining timber in the Northwest will ever be available for foreign shipment or for use in the eastern states. As southern production wanes it is inevitable that the Pacific Coast will have an almost complete monopoly of the timber and the East with its 50 million people must compete with the Middle West, Japan and Australia for its requirements. It is plainly evident that what the South and West cannot supply the states in the north east must produce at home.

Only in a few groups of states such as in the south Atlantic, the Gulf Coast, the lower Mississippi and the Pacific northwest does the lumber production exceed their own consumption. In our 48 states there are 28 which do not produce their own needs in lumber but import from 10 to 95 per cent. The northern, central and eastern states together produce but 23 per cent of the lumber they use.

The pulpwood situation is one of grave concern. Fully a billion dollars is invested in mills and machinery in the North and East. Already we are supplying one-fifth of the needs from Canadian forests and little by little the industry is moving to Canada. The freight charges on pulpwood alone are $11,000,000 annually and the cost of pulpwood at the mills has quadrupled in 20 years. The permanence of the whole paper and pulp industry in our own state is being jeopardized by the rapidly vanishing supplies. The needs for softwood timber represent three-fourths of the total requirements and softwoods being almost entirely used for pulpwood in paper making, there is reason to feel more concern for the future of softwoods than for hardwoods.

The per capita consumption of lumber is decreasing in all the states which are not producing all of their requirements. Nevertheless with the increased number of uses for wood the consumption per capita even in states which produce nothing in the way of wood is extremely high. For instance Illinois consumes 375 board feet per capita while it cuts but 10 board feet per capita and grows less than this amount. Ohio consumes 245 feet per capita, cuts 43 and grows but 25. New York consumes 200 feet per capita, cuts 40 and grows but 30 feet. Connecticut consumes 208 feet per capita, cuts 52 feet and grows but 40. Massachusetts consumes 225 feet per capita, cuts 36 feet and grows 17 feet.

All the facts relating to the timberlands of the United States, the rate at which they are being cut, the duration of our virgin supplies, the trend of prices, markets and the cost of transportation point to opportunities for future profit in timber growing in New Hampshire. Second growth pine and spruce have higher stumpage values now than virgin timber grown in the South or West. Values of second growth timber are however rapidly increasing in other parts of the country and are noticeable in the South where only a few years ago practically no value was recognized. The northeastern states now have a higher percentage of second growth forests, the value of which for the future is beginning to be understood. Denuding forest land is a short lived policy at best and no clearer demonstration is needed than the disastrous effect of timber exploitation and land impoverishment which have taken place on such a gigantic scale years ago in the East, afterwards in the Lake States and the South and which is now taking place on the Pacific Coast.

Private Forestry Practice.

The production of timber crops is a long time investment and any land owner engaging in it is entitled to protection from forest fires, insects and diseases, a fair system of

taxation which shall not be burdensome while the trees are growing but unproductive, cheap trees for planting purposes and whatever help and advice can be made available in marketing forest products to the best advantage. Accessibility to industries using timber or available saw mills and markets must of course determine when and to what degree the management of private forests will progress. The public does not yet understand that before many decades the cost of lumber must be determined by the cost of growing it. This time will come as soon as it is no longer possible to pick up scattered timber here and elsewhere which has cost the owner little or nothing to produce. In other words timber growing will be in the nature of crop production and the management of small forests on good roads near markets will be the first to benefit and the owners of such lands should be the first to become interested. A farm owner during slack periods on his farm and with his own hands can often do more to put his forest area in productive growth than can the large owner less favorably located who must depend on hired labor.

Communities where there is too little timber to support any local industries or far removed from other markets cannot be expected to manage their woodlots according to forestry practice. Small lots of timber may have no ready sale and larger lots must be cut by unscientific methods. There is no excuse for such being done where lots are favorably located and it is a short sighted policy today for such owners to allow their woodlots to depreciate in growing value. It is most essential that permanent forest industries be maintained and wherever sufficient timber resources are available communities should strive to bring in new industries which will stimulate forest improvement and stabilize local business and farm enterprises. In this connection the field is wide open for the activities of local banks, Boards of Trade and commercial organizations to benefit their localities. Wealth in the form of growing timber has within a year been an important means of sav-

ing railroad branch lines from abandonment within our own state.

One community which has scarcely been visited by a portable mill in years has one or two small wood using plants and a market for both soft and hardwood hauled to the mills in the form of selected cuttings and thinnings. A fair profit and close utilization have been possible to these industries and the surrounding land owners greatly benefited by being able to market a variety of timber in relatively small amounts. Most of these owners would not have a steam mill put on their lots on account of the destruction to young growth, waste in operating and the danger from fire associated with steam mill operations. The present method gives them winter work for their men and teams, and leaves their woodlots in fine growing condition with unlimited possibilities for continued and regular cuttings. Fuel wood is trucked ten or fifteen miles to larger cities netting a stumpage value of at least $2 per cord. The excellence of the forest conditions as to variety and amount of young growth is a noticeable feature of this community. The same may be said of other sections both in New Hampshire and adjoining states where the beginning of a system of forest management is already under way. Some of the small permanent saw mill plants are finding it profitable to maintain retail lumber yards to furnish construction timber for local use and to saw out schedules on order. If this were more generally done especially about summer colonies there would be less demand for imported lumber shipped from the cities and more local lumber would come into use for construction purposes.

Returns from Growing White Pine.

A table indicating the financial returns from white pine was published in the 1922 report of the Forestry Commission and reprinted in the 1924 report for the purpose of showing the effect of taxes assessed at full value and 2½ per cent rate, together with interest charges at 5 per cent,

on planted and unplanted forests at different ages. An examination of this table reveals the fact that on account of accumulating taxes and interest charges, the highest net annual return per acre for both natural and planted growth comes at 40 years and amounts to $5.93 and $3.29 respectively. With markets now decidedly unfavorable for low grade box boards, which 40 year trees can only produce for the most part, the outlook at present values and with high taxes is decidedly discouraging. Every aspect of future timber production in New England points to the desirability of growing trees for at least 60 years in order to produce lumber of higher quality which will sell in our markets in competition with imported lumber.

The present classification law was intended to help take care of the situation confronting the woodlot owner by relieving him of the annual taxes on the growth under certain conditions, namely, that the present value of the growth alone shall not exceed $25 per acre on the average, and the land must be sufficiently well stocked as to promise to yield an average of 25,000 feet per acre in the future.

Applying the table mentioned above to a classified forest, it is found that the net annual return per acre at 40 years, if the growth is natural and the expense of planting has not been necessary, amounts to $8.62 and for a planted forest, amounts to $5.98. The highest net annual return, from a natural, classified forest, $9.46, is secured at 50 years and for a planted, classified forest, $6.39, at 45 years. In growing a classified forest 50 or 45 years some cutting would in the meantime probably be necessary in order to legally maintain the classification. Such cutting, however, if moderate and correctly done would tend to reduce accumulating interest charges, and give greater assurance of the higher net annual returns per acre obtainable in 45 and 50 years and perhaps for rotations up to 60 years.

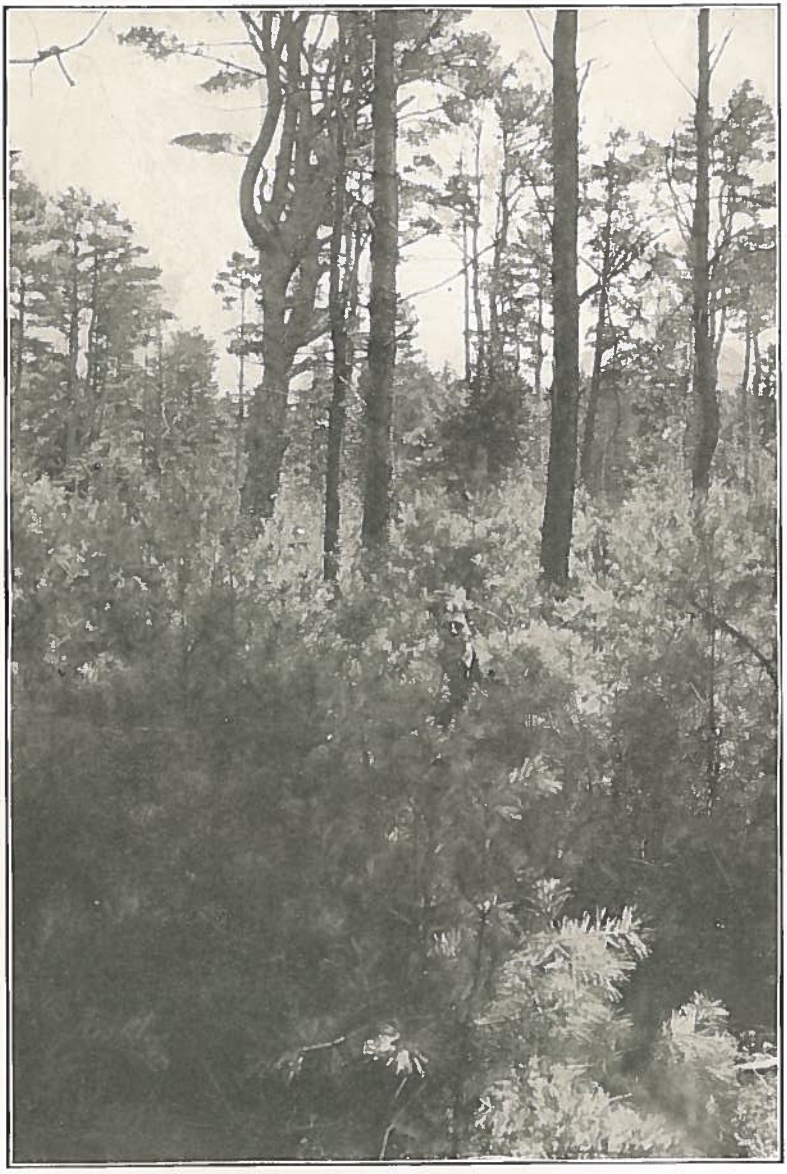
Periodic cuttings in a forest whose growth is relieved from annual taxes by classification make possible the growing of trees to really worth while size at a safe profit and

at stumpage values not much greater if any than those now prevailing for better grade timber. With increase in stumpage values, longer rotations and higher returns become possible. Nevertheless, trees of large size for high quality timber, requiring 75 to 100 years or more to develop, cannot be figured as a profitable investment, even with the growth relieved of taxes unless stumpage values in the future are far above what we can foresee now.

Cutting Small Trees.

On account of the high grade Pacific Coast lumber coming into the eastern market and the changes taking place in the box board market due to substitutes for the old time wooden packing box, New Hampshire timber owners in the future should give more thought to marketing conditions and what and how much should be cut from their woodlots from time to time.

In general our timber trees should be allowed to grow to larger sizes before being cut. Where there is a good market for small pines for cooperage stock or small spruce for pulp an opportunity is offered to thin out dense stands and generally improve woodlands but this does not change the general desirability of growing larger trees. For the timber of greater width and length and the highest grades we must of necessity depend on importations from the West and South as long as old growth timber is still available and people are willing to pay the necessary prices. As yet our importations are almost entirely from the highest grades of lumber while lower grades are either used at home or wasted. To the New Hampshire timber owner there is a margin of $8 to $20 per thousand in his favor due to freight charges to encourage him in the marketing of his timber. Where very high quality or unusual sizes are not demanded New Hampshire land owners must in the future be able to produce at home the common lumber and dimensions for construction purposes and the lumber and other various products for local industries. A market



YOUNG PINE REPRODUCTION UNDER SEED TREES.

for sash and door stock and other products now being largely supplied from a distance will be open in the future to growers of timber within the state. It is by no means too early to begin the production of the timber for future needs knowing that the higher grades now and always will have a ready sale at prices no lower than at present and that the introduction of lower grades from a distance can be prevented by the lower prices of timber grown at home.

We are not looking ahead sufficiently to the possibilities of profit in timber production when we permit our woodlands to be stripped clean at one time, particularly the softwoods, pine and spruce, and persistently make no provisions to protect young trees at present too small for profitable use. Most woodlots are owned by farmers and other local individuals who depend on selling stumpage to some lumber dealer or operator at a lump sum. It is exceptional when a contract is drawn in detail stating what trees shall not be cut and requiring reasonable care to leave the young unmerchantable growth in thrifty condition. Written contracts (See form of blank contract Page 143, Report of Forestry Commission 1922) usually permit the purchaser to remove all sawable timber or all the wood and timber on the lot with no reference to saving reproduction or young trees throughout the older growth or providing restricted areas where no cutting should be done. Furthermore, the land owner even with what reservation his contract may contain does not attempt to safeguard his own interests during the cutting operation. A portable mill is placed on the lot and the cutting is done in strips or windrows leaving long parallel lanes of brush. Trees of too small a size to really justify the operator in the expense of cutting, hauling and sawing are nevertheless put through the mill and the trees of a still smaller size are cut down by choppers to get them out of the way or else are broken by teams or covered under piles of slash. After the operation is finished and the mill and lumber removed the land owner has left a lot of land virtually stripped of forest growth

which under the usual conditions will produce nothing but weeds and inferior hardwood growth of little or no value for many years. He becomes possessed of a liability instead of an asset. Such land over a period of say 40 years without any return and paying a tax on a bare land value of $5 per acre at 2½ per cent results in an average loss to the owners of $1.22 per acre each year on account of the accumulating interest and tax charges. If instead such area was continuously growing pine or other valuable trees as a result of saving those under 8 or 10 inches on the stump, it would be possible to make two or more cuttings during the 40 year period.

Next to a more equitable system of taxing growing timber than now exists probably the most urgent need in forestry today is saving young trees. The next cut of timber on a lot is largely determined by the young growth and reproduction on the ground after the last cutting. If all this is destroyed without any means of reseeding the area a generation of brush and weeds must follow. The present general practice of cutting and destroying everything on a lot at one time is not only unprofitable to the operator but is an actual outrage to the land and a monument to the short sightedness of its owner. Valuable as portable mills are in making possible the operation of inaccessible timber holdings, they are too often destructive to the practice of forestry as well as a serious cause of forest fires. On the other hand permanent mills or wood industries located away from the timberlots enable land owners within the territory to market timber from their woodlots year after year without depleting them and tend to build up prosperous communities and greater interest in conservative cutting.

Selling timber by the cord or thousand feet instead of in the lump, which becomes the practice when logs are hauled from the lot to permanent mills, results in far better treatment of the forest and the continuous production of trees on the same land. If the land owner is unable because of market conditions to sell in this manner but is forced to

sell his timber in a lump sum he should certainly provide in his contract for saving the young trees below a size profitable to cut and see that his provisions are carried out. The cutting of small trees at best produces only low grade lumber which is slow to sell. An over proportion of low grade tends to depress the price of higher grades and reduces the average selling price. In felling, butting and sawing trees 8 inches in diameter the labor cost per thousand is twice as high as for trees 15 to 20 inches in diameter. The cost of hauling or trucking is at least three times as much per thousand for the smaller trees as for the larger ones and a saw mill is only working at highest capacity when it is sawing the larger trees. In every item of expense of operating from the stump to the market the cost of cutting small trees is at least doubled and with present high wages and costs of team or truck hire and the abundance of low grade lumber which at best is slow to sell at the very lowest prices, there can be little or no profit to the operator in cutting the small trees even if he has purchased them with the merchantable growth at a lump sum. Inasmuch as a large part of the lumbering is done by contract, the stumpage owner usually does not suffer the loss from cutting small trees because the burden is shifted to the operator who contracts to do the work from stump to stick. The operator and the land owner are the losers thereby.

Real progress will take place when the land owners as a body begin to consider the needs of the woodlot itself rather than the desires of the purchaser of the stumpage. The prospect of rapid growth and succeeding cuts following a lumber operation should determine the character and extent of the cutting. The owner should ask himself what are the possibilities of reseeding after cutting, what percentage of trees there are on the ground under 8 inches, when can another cutting take place if the small trees are left to grow and if there are seeding pines of larger size on the lot or adjoining it which can be depended upon for

seeding up the area again? These questions properly answered and acted upon are of tremendous importance to the land owner and the community.

It is not unreasonable or far wrong to say that the average pine woodlot can be cut over about every 15 years in a manner satisfactory to both operator and land owner if the pines under 8 inches or better under 10 inches are saved each time. No hard and fast rule should govern the diameter limit in cutting because some smaller trees badly crowded and without tops would better be cut than left and always there are larger pines as unprofitable to cut as small trees because of the poor quality of lumber they contain but which are of great value for seeding purposes. Such trees should be left wherever possible especially in the larger openings if there is a deficiency in young growth. The accelerated growth of smaller trees after a conservative cutting is usually little understood. It is not generally realized to what extent crowded trees will develop their crowns after a stand has been opened up. With the exercise of some judgment in the leaving of trees the loss from wind fall and sun scald is not a serious factor.

A 25 acre lot recently examined in Rockingham County has carried two cuttings, during the past 25 years, each of 150,000 feet of pine and within another 15 years can be cut over again without any reduction in the capacity of the lot to continue these periodic cuttings. There is abundant reproduction and the trees 4 to 8 inches in diameter are in vigorous condition showing growth each year at least half an inch in diameter. The boundaries of the lot are clearly distinguished from adjoining property by the abundance and varied sizes of the standing trees. The owner is not an operator but sells his stumpage by the thousand down to 10 inches and stays on the lot with the choppers to see that they do not destroy smaller trees. Every now and then examples such as this are found. In every case the owner has a real interest in the future timber growth on his land and finds no difficulty in carrying out his purpose.

PUBLIC FORESTS.

The term "public forest" implies any forest tract owned and permanently maintained by the public for purposes of forest production. In our own and other countries there are various public agencies thus responsible for acquiring and holding lands for forest purposes. In times gone there were vast areas of forests held by the public for distribution and sale to private ownership but these were not public forests as we now understand them. The change from disposal to acquisition has come about only as an understanding of the forest needs of the future became impressed on the public mind, together with a realization of the responsibility of the public not only to engage in the task of building up new reserves of timber for future use, but to set examples of proper forest culture and management for the private land owners to follow. Had the public years ago realized our future forest needs, such vast areas would never have been permitted to escape from public ownership.

In the public forests of foreign countries, many of them acquired centuries ago, ownership is vested in much the same public agencies which we have made responsible in own own country in recent years, corresponding to federal or national, state and municipal for the most part. In many European countries the municipal forests occupy a much larger area in the aggregate than federal and state combined.

In the United States the first national forests were set aside from remaining public lands in the West where the value was chiefly in the timber. This was in Cleveland's Administration in 1891 and long after the choicest accessible timberlands had passed to private ownership. The great impetus to National Forest acquisition came during Roosevelt's Administration when the bulk of the remaining forests on public lands were placed in National Forests.

Not until 1911 did acquisition by purchase, in order to create National Forests in the eastern states, become effective by act of Congress.

During the long period of state building, the supreme effort was directed toward land settlement and practically none of the eastern states retained any of their lands. The task of building up state forests in these states in recent years has been slow, except in the two outstanding examples of New York with its two million acres and more of forest preserve and Pennsylvania with more than one million acres. In some of the Lake States and in the Northwest great progress is also being made in state forest development because they were able to set aside forest lands still in their possession and to take back the title to many others for failure of their owners to pay taxes after the timber had been removed.

The story of town ownership of forest land is not unlike that of the National Government and the States. In the settlement of our towns in the East, particularly in New England, after they were chartered and surveyed, titles to lots were distributed in various ways by the proprietors of each town prior to the Revolution and afterwards by the towns themselves. Titles to certain lots were given to the church and its settled minister, the school and to other public and semi-public agencies. Some of the poorer lands were never allotted. Many church, school and town lots were sold and re-sold during the years following. Titles to lots never relinquished by the towns became clouded and the lots forgotten. Possession by occupancy, absence of opposition to timber cutting, destruction of bounds, quit-claim deeds without shadow of real title have during the generations past completed the confusion regarding lands which formerly and should today be vested in public ownership by the towns. Here and there, title in the town, church and school is still clear and some lots of this character are now forming the nucleus of town or church forests, in the development of which there is great oppor-

tunity and equally great local responsibility. Any interested individual or group, such as a town forest committee, willing to render public service and with leisure to investigate may find an almost unlimited field in which to study town records and history with the possibility of clearing up title and bringing back into town ownership areas which may from this time on be improved and classed as town forests.

Within our own state we have national, state and town forests in the making and already progressing sufficiently far to become a factor in the matter of producing future timber supplies, helping to stabilize local forest industries and contributing to our welfare in summer business as well as in permanent, rural benefits. Our public forests serve recreational interests without impairing their value for timber production. While it would be unthinkable to cut timber on some of the public reservations where unusual scenic or recreational features are enjoyed, there is no necessity for setting aside forest lands in New Hampshire purely as public parks, as in the so-called National Parks and some State Parks, toward which there is a growing public tendency.

The following pages are intended to show the present status and progress during the last biennial period of the Federal, State and Town Forests in New Hampshire. In addition to these, there are semi-public reservations of the Society for Protection of New Hampshire Forests, the Appalachian Mountain Club, certain hotel companies, schools, institutions, clubs and associations which have been more or less described in preceding reports.

WHITE MOUNTAIN NATIONAL FOREST.

By Ira T. Yarnall, Forest Supervisor.

Extent.

The present acquired area is approximately 431,846 acres in New Hampshire and 32,892 acres in Maine, equal

to about half what may be called the main mass of the White Mountains—the region stretching from the southern base of the Sandwich Range on the south to the Ammonoosuc and Moose River Valleys on the north, and including the Presidential, Carter-Moriah, and Franconia Ranges. Under the present purchase policy additional areas are being acquired each year. Ultimately the National Forest will reach a size of something like a million acres. This will carry the forest northward over mountains beyond the Ammonoosuc and Moose Rivers as far as and including the Pliny Range. A small portion of the land already bought lies in this northern extension of the White Mountain region.

Improvements

The Federal Highway Act has made available two classes of funds for work on roads and trails. The Forest Highway Fund is for Forest roads of primary importance to the State, counties or communities within, adjoining or adjacent to the National Forests. In 1926 the Pinkham Notch Highway was improved by the re-construction of one and one-third miles. In financing this project $25,000 Forest Highway and $13,000 State Funds were used. In addition Forest Highway Funds were used for building a new section on the Swift River Highway, which eliminates the steep grade over the hill.

The Forest Development Fund according to the Act is provided for the construction and maintenance of roads and trails of primary importance for the protection, administration and utilization of the National Forest, or when necessary for the use and development of the resources upon which communities within or adjacent to the National Forests are dependent. The Forest Service spends this money on maintaining a number of existing roads and in the gradual building of additional roads.

Timber.

The White Mountain National Forest, as at present constituted, contains one billion board feet of merchantable timber. The forest is capable of producing 60 million board feet of forest products yearly on a sustained-yield basis. Under complete protection and proper management, the condition of the forest would be steadily improved by utilization to that extent, and one problem ahead is to bring about this degree of use. Although this can not be done at once, a growing demand for forest products in the face of a demonstrated, increasing, and permanent shortage of supply must inevitably cause the White Mountain National Forest to play a greater part in supplying the timber needs of New England without in any degree lessening its recreational and scenic values.

Present plans provide for a possible annual cut of 20 million feet, board measure. About two-fifths of this possible cut was marketed during the calendar year 1925. Each year the cut may reasonably be expected to increase until the above amount is reached.

Cash and Road Fund Contribution to Townships in the Forest.

The Federal Government does not pay direct taxes to the counties and States on the land acquired for national forests. In lieu of direct taxation, a Federal law requires that 25 per cent of the gross revenue of the national forest be paid to the State treasurer for distribution to the townships in which the forest is located. Necessarily, receipts were limited during the first years of the administration of The White Mountain National Forest. Each year shows a larger return, however. In 1915 the total receipts were $548, while in 1925 they exceeded $39,000. The annual gross receipts should continue to grow until they reach at least $80,000.

In addition to the sum directly returned to the townships,

10 per cent of the gross receipts of the forest is expended by the Forest Service in the construction of roads and trails of value to the townships. Then, too, under the various Federal aid and road acts, a total approaching $100,000 has been expended in the White Mountain National Forest to date in further extension and maintenance of the splendid road and trail system now available for the use of the local and visiting public.

The Public Investment.

The people of the Nation have invested approximatelv $3,300,000 in the White Mountain National Forest—$7.50 an acre. The land value, without the merchantable timber but including young growth in various stages, is conservatively placed at $2.75 per acre. The merchantable timber is valued with equal conservatism at $9 per acre. Thus these major values, readily convertible to terms of dollars and cents, indicate clearly that in acquiring this great property the public has bought wisely. Moreover, the less tangible values of protected watersheds and free public recreation are of great importance. All of the values will doubtless increase steadily under adequate protection and careful utilization. In the operation of the property receipts have approximately balanced the actual expense of protection and administration. Additional expenditures have been made each year to provide adequate systems of transportation and communication and various other permanent improvements which add to the value of the forest as a public property.

Recreation.

No mountain region in the United States is so intensively used for public recreation as the White Mountain National Forest. And Forest Service policies and practices promote this use in every practicable way, recognizing public recreation as a resource of the Forest to be developed for

the maximum benefit to the greatest possible number of people.

The National Forest is free to all. No commercialization of the scenic features under Forest Service control is permitted. No exclusive use permits for the occupancy of choice summer camp sites are issued, every such desirable site being held open for present or foreseen public need. No clutter of cheap concessions is allowed to mar the beauty of the Forest drives. No entrance fee is exacted from the visitor.

Forest Trails.

From the time people began to spend summer vacations in this region "hiking" has been a recognized form of recreation and the best means for actually seeing the White Mountains and enjoying the natural beauty of the woods. The Forest Service has built over 300 miles of trail, which, together with the much greater trail mileage built and maintained by the Appalachian Mountain Club and kindred organizations, open to the hiker every important section and all of the higher peaks. Three classes of trail location and construction have been used.

The "sporty" trails disregard uniform grades, have very difficult climbs over rock ledges and cliffs, and require hard physical exertion. These are the trails that delight the hearts of the seasoned mountain climbers.

The opposite type has a more or less uniform grade. The tread is graded, all windfall is cut out, and overhanging limbs are removed. These paths are enjoyed by people desiring an easier climb to high peaks, but require sufficient physical exertion to test the less seasoned person.

The third class is a mixture of the other two. Generally the tread is not graded, and the trail is located on steep ground but detours around the difficult bluffs and ledges.

All classes of hikers are provided for by one or another of these three types of trail. Persons unused to mountain

climbing can graduate from one type to the other and finally become expert in mountain climbing.

The Forest Service has built and maintains open shelters for the use of the public at Wild River, Hermit Lake, Russell Pond, Mountain Pond, and Camp 19. Many of the Mountain Clubs have built and maintain huts and open shelters which form an important link in making the mountains enjoyable and safe.

Roadside Camp Grounds.

Roadside camping, which has been practiced in the West for a number of years has become very popular in New England. The Forest Service has encouraged this form of recreation, and now a large number of automobile travelers carry camp outfits and enjoy the pleasures of communing with nature. To accommodate these campers the Forest Service has constructed and maintain five public camp grounds along the main highways. Care is taken to develop and maintain pure water supplies, necessary sanitary facilities are provided, central fireplaces have been constructed, and free fuel wood is obtainable on all these areas. Forest officers visit the grounds as often as their duties permit, and they are ready to assist the public in any way they can.

Dolly Copp Camp Ground is 6 miles south of Gorham along the Peabody River and just off the Pinkham Notch Highway (Route No. 16). Over 5,000 visitors camp here each year.

Zealand Camp Ground is between Twin Mountain and Fabyan, between the Theodore Roosevelt Highway (Route No. 18) and the Ammonoosuc River. It is used increasingly each year.

Gale River Camp Ground is between Twin Mountain and Profile Notch, on the Daniel Webster Highway (Route No. 6). It contains a number of small open spots and is ideal for the camper seeking the quiet of a secluded retreat.

A new camp ground known as White Ledge has recently

been established just off the main highway from Boston (Route No. 16) close to the beautiful region around Chocorua.

Oliverian Camp Ground is two miles north of Glencliff (Route 25), and contains sufficient space for a number of camps.

An improved parking space has been constructed at the entrance to the beautiful Glen Ellis Falls.

The Forest Fire Menace.

Through the summer and often late into the fall the menace of forest fires is ever present in the White Mountains. Use of the forest for vacation purposes each year by over 700,000 people naturally increases the fire hazard and makes it incumbent upon each visitor to do everything possible to prevent such a disaster as a single fire might readily precipitate. As a precautionary measure all campers are required to secure a camp-fire permit (free) from the nearest fire guard or ranger or from the forest supervisor at Laconia, N. H., before building a camp fire within the forest. This applies to any fires, either open or in stoves, outside of buildings.

In co-operation with the State forestry departments of New Hampshire and Maine, the Forest Service provides a system of fire detection and suppression composed of lookouts on certain peaks, patrolmen, guards, district rangers, and forest headquarters, all in touch with each other by telephone and so organized as to get promptly into action whenever a fire is seen or reported. Fire tool caches are conveniently placed along main routes of access to the timber bodies and advance arrangements permit the quick mobilization of crews of fire fighters among local people and visitors. New England may justly be proud of the fact that, in spite of the intensive public use of the forest, very few fires have occurred in recent years. The need for constant care and watchfulness never ceases, however, since a single cigarette stub carelessly tossed into the duff

is a potential conflagration which would destroy for generations the beauty of the region and entail tremendous economic loss.

Forest Organizations.

To handle the large variety and quantity of work on an area of such intensive use requires a definite organization. This is provided as follows:

The entire national forest is in charge of a forest supervisor, who has immediate supervision of all activities. The headquarters office is maintained at Laconia, N. H.

The national forest is divided into four ranger districts, each in charge of a district ranger, who is responsible for the administration of his district and the handling of the different forms of work. District rangers maintain homes and offices in Gorham, Twin Mountain, Bartlett, and Woodstock, N. H.

Map and booklets of the White Mountain Area showing the location of the Forest and other features are available through application to the Forest Supervisor at Laconia.

STATE FORESTS AND RESERVATIONS.

During the biennial period from July 1, 1924 to June 30, 1926, the acreage of state forests and reservations was increased from 20,538 to 21,283 acres. This increase of 740 acres consists of 645 acres purchased at an average of $5.25 per acre and gifts amounting to 95 acres. The usual purchase program suffered somewhat by the necessity of transferring state land funds to the improvement of the nursery during 1925 and by failure to complete an important acquisition near the close of the biennial period, with the result that $1,500 reverted to the State Treasury unused. This property might have been acquired but not at a price which the Department felt that the State should pay. All of the purchases made were additions to existing State reservations, except one in Loudon, the policy being to enlarge the present state holdings where this can and should be done and to start new units for demonstration and other purposes only where the land can be acquired at a low price and there is a sufficient reason for public ownership.

The state has lost a benefactor and friend of forestry in the death of Mr. Joel H. Poole which occurred February 28, 1926 while in his 85th year. He was one of the pioneers in forestry interest and with his son the late Arthur W. Poole raised the funds to acquire what is now the State Forest Reservation of 500 acres on Mount Monadnock. Several years ago the elder Mr. Poole undertook the construction of a Memorial Road from the main highway near the Ark to a point within the reservation—a distance of over a mile. He lived to complete the road and to deed the same to the state as a gift. He also constructed a parking space at the head of the road sufficient for 200 cars, built fireplaces for picnic and camping parties, erected a flagpole and brought running water to the place from a nearby brook. The department has recently placed a tablet

near the entrance marking the Road as a gift to the state from Joel H. Poole in memory of his son.

The town of Jaffrey has acquired an additional water supply on Meade Brook where it leaves the Monadnock State Reservation, land for the same having been furnished by the late Joel H. Poole. A small portion of the flowed reservoir is on the state reservation itself. An act was passed by the Legislature of 1925 authorizing the town of Jaffrey to acquire this water privilege. The work has been completed, the town has secured a valuable additional source of water and the State Reservation and its surroundings are greatly improved in appearance and usefulness.

An effort has been made to attract visitors and campers to the Pillsbury Reservation in Washington. Over 3000 acres in extent and including several small lakes forming the headwaters of the Ashuelot River, this forest tract offers many possibilities to campers, once it becomes better known. The highway from Washington Center to Goshen, known in earlier days as the Cherry Valley Road, has been much improved by the towns since lumbering operations and heavy teaming were discontinued several years ago. This highway adjoins the Pillsbury Reservation and a serviceable roadway leads from the highway to May Pond, less than a mile distant, where the state ranger makes his headquarters and several camps are located. Some are under lease to private parties and one or two have been made available the past season for use by other parties at a small charge. These camps were built from old camps and equipped with stoves and other necessary cooking utensils and mattresses. During the 1926 season 199 automobiles and 743 persons were registered at the May Pond camps.

During the past few years the recreational facilities of the Crawford Notch Reservation have been steadily improved and the public has appreciated and taken advantage of them. The Willey Cabins, under lease of Messrs. Donahue and Hamlin of Bartlett, have offered food, lodging and other accommodations in a satisfactory manner and at very mode-

A LARGE BOULDER WITH BRONZE TABLET NOW MARKS THE SITE OF THE WILLEY HOMESTEAD IN THE CRAWFORD NOTCH.

DEDICATION OF TABLET AT THE ONE HUNDREDTH ANNIVERSARY OF MT. WILLEY SLIDE. CRAWFORD NOTCH STATE RESERVATION.

rate prices. Rest room and camping privileges have been enjoyed by thousands of people without cost. On July 16 of the present year, the 100th Anniversary of the famous Willey Slide catastrophe, a bronze tablet was dedicated by the North Conway Chapter of the Daughters of the American Revolution to the memory of the Willey family, marking the site of the original Willey home. Suitable and impressive exercises and a pageant representing the early history of the North country brought many people to this historic spot.

Mention has been made in previous biennial reports of the gifts of land by Miss Caroline A. Fox of Arlington, Mass., and Hillsboro, N. H. Realizing for sometime the desire to have the Forestry Department in a position as regards funds and equipment to conduct certain experimental and demonstrational forest work on and near property she has previously given to the state, she has accordingly created a trust fund in Boston making the Forestry Department the legatee upon her death. It is her desire that her present home and improved property in Hillsboro shall be used as headquarters for carrying on this field of work. While in no way desiring to restrict the lines of work undertaken, she feels that the importance of it justifies an established field headquarters with sufficient equipment and land and that her property in Hillsboro is adapted to this use. She has accordingly made provisions so that in time the Forestry Department will be able to conduct important lines of investigation relating to forestry without cost to the state.

The following Table 2 gives the name, date of transfer, location, area and other data of each tract acquired by the state during the past two years and Table 3 gives the name, location and acreage of all state forests and reservations to date.

TABLE 2.

STATE FORESTS AND RESERVATIONS ACQUIRED IN 1925 AND 1926.

Name.	Date of Transfer.	Location	Area.	Condition of Tract.	Purchase cost.	Purchase cost per acre.
Grant Tract	March 12, 1925	Fitzwilliam	6	Mostly hardwoods	Gift	
Pitcher Mountain	September 4, 1925	Stoddard	5	Open land	Gift	
Stevens Tract	November 19, 1925	Nottingham	4	Old growth pine	By will	
Sawyer Tract	March 29, 1926	Jaffrey	80	Mostly hardwoods	Gift	
Soucook Tract	July 21, 1926	Loudon	50	Young pine and hardwoods	$250.00	$5.00
Nursery Addition	July 21, 1926	Salisbury	115	Cut over with young growth	345.00	3.00
Welton Falls Addition	July 22, 1926	Alexandria	98	Good hardwoods	500.00	5.10
Black Mountain Addition	July 22, 1926	Haverhill	40	Young pine and hardwoods	240.00	6.00
Pawtuckaway Mt. Addition	November 1, 1926	Nottingham	92	Merchantable pine	1,550.00	16.85
Cardigan Mt. Addition	November 15, 1926	Canaan	250	Cut over	500.00	2.00
		Purchase area	645		$3,385.00	$5.25
		Gift	95			
			740			

TABLE 3.
STATE FORESTS AND RESERVATIONS
JUNE 30, 1926.

No.	Name.	Location.	Date Acquired.	Acres.	Gift or Purchase.	Cost of Planting.	Purchase Cost and Planting.	Approximate Present Value.
1.	Miller Park	Peterboro	1891	3	Gift	.....	.....	$50.00
2.	Cathedral and White Horse Ledge	Conway	1901	118	Gift	$82.92	$82.92	1,000.00
3.	Monadnock	Jaffrey	1915	493	Gift	148.98	148.98	8,000.00
4.	Haven	Jaffrey	1908	95	Gift	21.82	21.82	15,000.00
5.	Harriman-Chandler	Warner	1911	405	Gift	226.72	226.72	3,100.00
6.	Crawford Notch	Hart's Location	1913	5,925	$68,000.00	.....	68,000.00	125,000.00
7.	Merriman	Bartlett	1913	530	Gift and $150	.....	150.00	5,000.00
8.	State Nursery	Boscawen	1914	257	3,780.00	496.27	4,276.27	8,000.00
9.	Huckins	Ossipee	1914	100	Gift	1,081.33	1,081.33	1,500.00
10.	Everett	Dunbarton	1915	56	682.00	404.95	1,086.95	1,200.00
11.	Walker	Concord	1915	47	Gift	445.10	445.10	1,200.00
12.	Davisville	Warner	1915	32	125.00	390.85	515.85	640.00
13.	Alton Bay	Alton	1915	209	522.50	735.17	1,257.67	1,400.00
14.	Mast Yard	Hopkinton	1915-20	400	2,239.00	3,159.23	5,398.23	7,000.00

TABLE 3—*Continued.*

No.	Name.	Location.	Date Acquired.	Acres.	Gift or Purchase.	Cost of Planting.	Purchase Cost and Planting.	Approximate Present Value.
15.	Sentinel Mountain ...	Piermont	1915	143	$712.50	$175.28	$887.78	$1,500.00
16.	Livermore Falls	Campton	1916	134	910.00	727.36	1,637.36	3,000.00
17.	Blue Job	Farmington	1916	99	700.00	99.25	799.25	1,000.00
18.	Mascoma	Canaan	1916	174	700.00	670.14	1,370.14	1,500.00
19.	Litchfield	Litchfield	1916	122	325.00	505.13	830.13	1,000.00
20.	Salmon Falls	Rochester	1916	20	60.00	507.52	567.52	600.00
21.	Bear Brook	Allenstown	1916	413	1,000.00	568.24	1,568.24	2,500.00
22.	Sugar Hill	Bristol	1917	57	Gift	60.88	60.88	1,500.00
23.	Kearsarge	Wilmot	1917-19	839	6,396.50	941.68	7,338.18	9,000.00
24.	Jeremy Hill	Pelham	1917-18	63	825.00	.....	825.00	1,000.00
25.	Cardigan Mountain ..	Orange and Alexandria	1918-24	2,600	9,150.00	221.96	9,371.96	15,000.00
26.	Honey Brook	Marlow	1918-21	464	2,690.00	1,188.98	3,878.98	6,800.00
27.	Stoddard	Stoddard	1918	71	335.00	.....	335.00	1,000.00
28.	Dodge Brook	Lempster	1919	62	248.00	116.98	364.98	500.00
29.	Black Mountain	Haverhill	1919-20	383	877.52	.....	887.52	2,240.00
30.	Scribner-Fellows	Ashland	1918	140	Gift	568.84	568.84	2,000.00

TABLE 3—*Continued.*

No.	Name.	Location.	Date Acquired.	Acres.	Gift or Purchase.	Cost of Planting.	Purchase Cost and Planting.	Approximate Present Value.
31.	Contoocook	Hopkinton	1920	30	$120.00	$231.79	$351.79	$400.00
32.	Nottingham	Nottingham	1920	16	200.00	80.00	280.00	400.00
33.	Ponemah	Amherst	1920	63	378.00	539.53	917.53	945.00
34.	Craney Hill	Henniker	1920	31	124.00	94.47	218.47	250.00
35.	Taylor	Concord	1920	7	Gift	85.88	85.88	925.00
36.	Pillsbury	Washington	1920-24	3,085	Gift and $575	.....	575.00	12,500.00
37.	Marshall	New Ipswich	1921	20	Gift	.....	.....	500.00
38.	Conway Common lands	Conway	1916-22	769	1,412.00	681.99	2,093.99	3,000.00
39.	Beech	Keene	1921	21	Gift	600.00	600.00	600.00
40.	Fox	Hillsboro	1922	328	Gift	81.91	81.91	13,500.00
41.	Annett	Sharon and Rindge	1922-23	1,092	4,000.00	340.59	4,340.59	6,800.00
42.	Green Mountain	Effingham	1922	15	200.00	.....	200.00	250.00
43.	Glover	Pembroke	1922	7	Gift	.....	.....	75.00
44.	Welton Falls	Alexandria	1923	188	1,000.00	.....	1,000.00	1,500.00
45.	Pawtuckaway	Nottingham	1923-24	857	4,950.00	.....	4,950.00	8,200.00
46.	Blair	Campton	1924	112	800.00	.....	800.00	1,000.00

TABLE 3—*Concluded.*

No.	Name.	Location.	Date Acquired.	Acres.	Gift or Purchase.	Cost of Planting.	Purchase Cost and Planting.	Approximate Present Value.
47.	Red Stone	Conway	1924	43	250.00	348.76	598.76	650.00
48.	Grant	Fitzwilliam	1925	6	Gift	.....	.....	50.00
49.	Pitcher Mountain	Stoddard	1925	5	Gift	.....	.....	50.00
50.	Stevens	Nottingham	1925	4	Gift	.....	.....	500.00
51.	Sawyer	Jaffrey	1926	50	Gift	.....	.....	800.00
52.	Soucook Tract	Loudon	1926	50	250.00	.....	250.00	300.00
				21,283	$114,687.02	$16,630.50	$131,317.52	$281,425.00

REFORESTATION TRACTS OWNED BY STATE.

21,253

No.	Name.	Location.	Acreage.	Cost of Planting.	Approximate Present Value.
1.	Jason E. Russell	Greenville	25	$163.06	$500.00
2.	George B. Leighton	Dublin	25	340.25	500.00
3.	John Q. Hodgman	Milford	18	434.80	300.00
4.	Charles H. Allen	Concord	25	291.98	375.00
5.	W. D. Baker	Rumney	5	57.35	75.00
			98	$1,287.44	$1,750.00

DESCRIPTION OF TRACTS ACQUIRED IN 1925 AND 1926.

Grant Tract.

Mr. Charles H. Grant of Brattleboro, Vermont gave to the State in March, 1925 part of his old Fitzwilliam homestead. This lot is located on the Richmond town line and within one-half mile of the Massachusetts state line. It contains six acres and is rather inaccessible because of the poor roads in this section but might form the nucleus of a larger acreage to be acquired at some later date.

Pitcher Mountain.

The Forestry Department has maintained a lookout station on Pitcher Mountain, Stoddard since 1915. Mr. Harry Burnett of Boston, Mass. has co-operated with the State in many ways and in September, 1925 gave the top of Pitcher Mountain so that the new steel tower might be located on State land. This five acre mountain top reverts to the grantor should the lookout station be abandoned.

Stevens Tract.

Four acres of valuable pine growth were left by will to the State upon the death of Miss Charlotte B. Stevens of Nottingham in June, 1925. This tract of pines extends along the easterly side of the Elm hill road for nearly half a mile and was reserved when the lot was cut over several years ago. There are some unusually large pines within this 100 foot strip to be held by the State for the public benefit and enjoyment. These trees are to be preserved for ornament and not for profit. Miss Stevens has set an example for others to deed roadside growth and to help make New Hampshire's highways attractive.

Sawyer Tract.

Misses Etta M. and Ella M. Sawyer of East Jaffrey deeded to the State 80 acres of forest land on the lower slopes of

Monadnock Mountain in March, 1926. This lot was given in memory of their father Mr. Leonard F. Sawyer, who for many years was prominent in Jaffrey town affairs. The tract is adjacent to land held by the Society for Protection of New Hampshire forests and only a short distance from the Monadnock State Reservation. The lot, which is covered mostly with a hardwood growth, helps to increase the total acreage now in public ownership on Mt. Monadnock.

Soucook Tract.

This department purchased 50 acres of growing pine, hardwoods and old field in the town of Loudon in June 1926. The tract is located on the Soucook river and includes part of the old Loudon road. Some of the open land has already been planted to pine and it is planned to finish this work next spring. There are many acres of young pine growth and trees of merchantable size are found on the northern slopes of this tract.

Nursery Addition.

One hundred and fifteen acres of cut over land on the Boscawen-Salisbury town line and adjacent to the Forest Nursery reservation were purchased during June 1926. This additional area is covered with a growth of hardwoods and young pine and will enable Nursery employees to make improvement cuttings from time to time as fuel is needed. The tract was purchased for $3.00 an acre and should prove a desirable asset.

Welton Falls Addition.

A tract of 98 acres of good hardwoods with scattering spruce and hemlock lying just south of the Welton Falls Tract was bought in June 1926. This area connects the present reservation with the old road to the Shem Akerman lots and permits better accessibility to the Cardigan Mountain trails already in use. Davis brook extends the entire distance along the eastern boundary and forms a valuable

fire line. Some of the open land has already been set to spruce.

Black Mountain Addition.

Mr. George F. Kimball of Haverhill, N. H. sold to the State 40 acres of growing forest during June 1926. This lot was bounded on three sides by land already owned by the State and it seemed very desirable to acquire this tract to consolidate these holdings. There are some valuable blocks of growing pine and spruce on this tract.

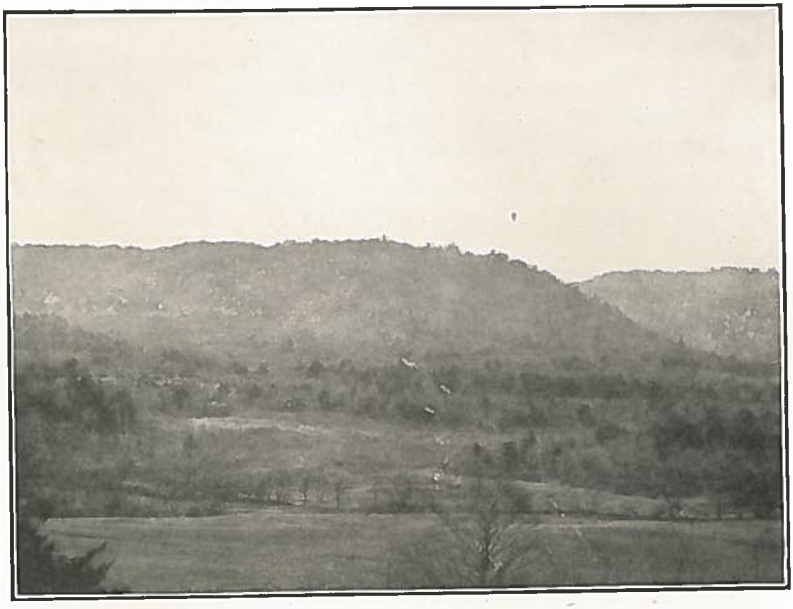
Pawtuckaway Mountain Addition.

For some time the Department has been anxious to acquire the easterly end of Middle Pawtuckaway Mountain in Nottingham. The State already owns 764 acres and this addition of 92 acres nearly completes the acquisition plan for this reservation. The Pawtuckaway tract now includes the three well known peaks and is practically the only reservation of any size in Rockingham County. About 250 M. tion of any size in Rockingham County. About 250 M. board feet of pine is also included in this purchase which makes the transfer all the more important as there appeared the possibility that this valuable growth might be sold to other parties. Opportunities are now offered to improve this stand of pine by cuttings as a portable mill is now operating stumpage that has been reserved on the old Chase farm. The price per acre is much larger than the State has usually paid; but this purchase was most desirable and important because of its location and the merchantable growth.

Cardigan Mountain Addition.

Two hundred and fifty acres of cut over land lying on the westerly side of Cardigan Mountain have been transferred to the State by the Peoples Trust Company of Lebanon, N. H. The original owners were not able to retain title after the timber had been cut due to loans from the Bank. The old mountain road passes through parts of these lots which

connect areas now owned by the State. Although the spruce has been cleanly cut, there are areas where young reproduction has started and with care should mature. This addition blocks out the holdings in the town of Orange and enables the state to control an area which has been a fire danger from slash and mill operations for several years.



MIDDLE AND SOUTH PAWTUCKAWAY MOUNTAINS. PAWTUCKAWAY STATE RESERVATION, NOTTINGHAM, N. H.

CARDIGAN MT. RESERVATION, ORANGE AND ALEXANDRIA, N. H. STEAM SAW-MILL OPERATING ON TUCKER LOTS.

TOWN FORESTS.

The Assistant State Forester, Warren F. Hale, received a leave of absence during the winter and spring of 1925 and took this opportunity to observe European forestry. The town forests of France, Germany and Switzerland were the most interesting. Practically every little village has its communal forest maintained principally to furnish fuel wood for local use but adding its bit to the national lumber pile. These forests are important sources of revenue to the village, help to reduce taxes and afford means for building town halls, roads and other local improvements. The density of population, nearness of markets and small forest areas are contributory economic factors which have enabled some of these forests to be in existence for hundreds of years. Land is valuable, sometimes worth several hundred dollars an acre.

On the Eberstadt town forest near Darmstadt, Germany; the same land is used for both agricultural and forest crops. The ground in the spring is plowed and prepared for pine planting, the one year old seedlings are planted one foot by three feet allowing 12,000 trees to the acre. Two weeks later 10 to 15 bushels of potato seed are planted in alternate rows. This is done to keep out the weeds and to make use of the land, as an agricultural crop can be raised without hurting the growth of the seedlings. An average of 10 to 15 acres per annum are worked in this manner on this communal forest where all work is done by women under the local forester. The town pays for all the seed and labor and sells the potato crop at harvest time to the highest bidder. This system is continued for two years when the pine seedlings are left to form the forest cover. This intensive use of the land and all forest products are characteristic of European forestry.

Realizing that there are opportunities for many of the New Hampshire towns to reforest waste land, protect water

supplies and to make greater use of forest areas already owned by some of the towns, efforts during the past few years have been made to arouse interest by holding meetings, appeals for appropriations at Town Meetings and interviewing Boards of Selectmen. The Tax Commission cooperated with this department by sending out questionnaires and thus obtaining an inventory of interesting facts. Some towns have retained their forest lands from the time of their charter. Northwood, Grantham and Newington still own lands, the receipts of which must be used for the support of the schools or for the support of the minister. Many towns have purchased whole water sheds to protect their water supply and furnish plenty of pressure in time of fire. Littleton, Concord, Hanover, Manchester, Keene, Jaffrey and Portsmouth have purchased thousands of acres for this purpose. Several towns own land in other towns; one town has not been able to find its 30 acres which has been listed on the town's books for 25 years; some towns acquired poor farms just prior to the Civil War and have held these lands since that date. Many persons have given lands to towns. Values range from $2.00 per acre to $1,200 per acre. The oldest town forest is Newington which appears to have held title to its land since 1710. At the present date, the Church, the School, Library and Cemetery are built on town land. The newest town forest is Wakefield established in 1925. There are now 61 Town Forests with an acreage of 11,643 acres, 1,357,000 trees planted; with an estimated value of $328,000. Table 4 gives a complete list of towns owning land in forest or which ultimately will be planted with trees, together with other facts. A more detailed description of the activities of some of the towns follows:

TABLE 4
NEW HAMPSHIRE TOWN FORESTS.

Town.	Area.	Gift or Purchase.	Date.	No. of Trees Planted.	Estimated Value.	Remarks.
Alton	8	Gift	1924		$5,000	Dedicated October 12, 1925.
Auburn	10	Tax Title	1925		100	Town owns other land in Chester.
Boscawen	8	Tax Title	1917	8,000	80	Trees planted in 1917.
Brentwood	4	Purchase	1917		2,400	
Campton	25	Gift and Purchase	1886		2,000	Timber in rear of cemetery.
Claremont	550	Purchase	1916		7,000	Water supply; 200 acres, Moody Park.
Concord	400	Purchase	1872	154,000	50,000	Protects water supply.
Conway	10	Gift	1917		500	Part of Cathedral woods.
Danville	75	Gift	1775		500	
Deerfield	5	Gift	1908		300	Valuable growth.
Derry	60	Gift	1920	5,000	2,500	Appropriated $500 for improvements.
Dublin	50	Purchase	1925		500	Appropriated $500 for gravel pit.
Durham	65	Gift	1900	10,000	1,125	Open land being planted; 75M timber.
Effingham	150	Tax Title	1915		2,000	120 acres cut over land.
Errol	150	Gift	1804		1,500	Cut over several years ago.

TABLE 4—*Continued*
NEW HAMPSHIRE TOWN FORESTS.

Town.	Area.	Gift or Purchase.	Date.	No. of Trees Planted.	Estimated Value.	Remarks.
Exeter	3	Gift	1911		$1,000	Young growth.
Franklin	184	Poor Farm	1893	18,500	15,700	3 separate parcels.
Gilsum	100	Tax Title	1901		1,000	Valuable young growth.
Gorham	200	Purchase	1912		2,000	Water shed in Randolph.
Grantham	125	Unallotted	1818		3,000	Tract owned since town was established.
Greenfield	22	Purchase	1878		7,000	
Hanover	1,417	Purchase	1921	58,000	39,000	Protection for water supply.
Henniker	50	Tax Title	1921		300	Second growth pine.
Hollis	201	Gift	1916	21,000	5,000	Under management of Forestry Department.
Hopkinton	27	Purchase	1890		2060	Town owns about $2,000 worth of timber in cemeteries.
		Gift	1925			
Jaffrey	347	Gift	1773	100,000	2,000	136 acres in Rindge.
		Purchase	1915			
Keene	1,910	Purchase	....	97,000	51,000	Cut off 630 acres for $14,600 in 1922.

TABLE 4—*Continued*
NEW HAMPSHIRE TOWN FORESTS.

Town.	Area.	Gift or Purchase.	Date.	No. of Trees Planted.	Estimated Value.	Remarks.
Lempster	32	Tax Title	1906		350	Wild land.
Littleton	337	Gift and Purchase	1921		$20,000	Water shed in Bethlehem.
Londonderry	2	Taxes	....		50	Valuable growth.
Loudon	119	Gift	1908		700	Part in Canterbury. Some fine timber.
Lyndeboro	5	Gift	1890		500	
Madison	158	Gift	1924		500	Approximately $100 for improvements.
Manchester	1,800	Purchase	1926	809,000	25,000	Plantation around Massabesic Lake.
Marlboro	53	Gift	....		300	Sprout land.
Mason	27	Gift	1923		200	Sprout land.
Meredith	175	Gift	1896		350	Timber recently been cut.
Merrimack	93	Gift	1925		1,000	5 separate pieces.
Milan	200	Tax Title	1895			
		Purchase	1925		2,500	Old farm and spruce land.
Milton	140	Purchase	1839		2,000	$16,000 value of timber cut from Poor Farm.

TABLE 4—*Continued*
NEW HAMPSHIRE TOWN FORESTS.

Town.	Area.	Gift or Purchase.	Date.	No. of Trees Planted.	Estimated Value.	Remarks.
Mount Vernon	8	Tax Title	1900		50	Hardwood growth.
New Boston	8	Purchase	1916		50	
Newington	112	Unallotted	1710	8,000	$5,800	Oldest Town Forest.
Newport	30	Purchase	1898		4,500	Fine growth of young pine.
Northwood	400	Unallotted	1773	10,000	3,000	Appropriated $175 for planting.
Peterboro	11	Tax Title	1903		300	Sprout land.
Pittsfield	68	Purchase	1924	3,500	750	Appropriated $600 for improvements.
		Gift	1925			
Portsmouth	240	Gift	1917	10,000	26,000	Island of 27 acres in harbor included.
		Purchase	1886			Appropriated $500.
Raymond	12	Purchase	1918	1,000	1,200	High school on town land.
Richmond	100	Tax Title	....	17,000	1,000	12 acres of fine pine.
Salisbury	40	Purchase	....		1,400	Valuable young growth.
Springfield	40	Purchase	1917		500	Royal Arch.

TABLE 4—*Concluded*

NEW HAMPSHIRE TOWN FORESTS.

Town.	Area.	Gift or Purchase.	Date.	No. of Trees Planted.	Estimated Value.	Remarks.
Sullivan	100	Gift	1859		500	Poor Farm.
Unity	3	Purchase	1885		142	
Wakefield	100	Purchase	1925	2,000	400	Appropriated $400 for land and trees.
Warner	804	Gift	1920	22,000	$14,000	Appropriated $775 for planting.
Warren	80	Gift	1914		1,000	50 acres agriculture.
Weare	100	Purchase	1837		2,000	Poor Farm. 50 acres should be planted.
Webster	16	Purchase	1874		600	Valuable young growth.
Wolfeboro	34	Purchase	1910	3,000	5,750	Water supply. Appropriated $600 for planting.
Woodstock	40	Purchase	1897		1,000	Two tracts covered with valuable growth.
Totals	11,643			1,357,000	$327,957	

DESCRIPTION OF CERTAIN TOWN FORESTS

Northwood

At the town meeting held in 1924 it was voted to ask the Selectmen and a town forest committee just appointed to investigate and examine the lands already owned by the town. A report was made at the town meeting held in 1925 and indicates that Northwood has made an effort to put its forest owned lands in growing condition. A tract of land known as the School lot is situated in the southerly part of the town a short distance from the Nottingham line and is lot number 3 in the 7th range of lots. This lot by the old records was laid out 78 rods wide but is in fact nearly 100 rods wide and extends from the 8th range way to Deerfield line a distance of one mile. The lot contains about 200 acres. Part of Knowlton Pond is in this lot so that the actual land area is less than 200 acres. The road which follows for some distance over the mountain along the 8th range way, turns to the south on lot No. 4 and passes through lot No. 3 which is the School lot, and leaves about 32 acres of this lot on the north side of the road. Eight acres are fields and pastures and 24 acres are covered with pines, hardwood and bushes. The pines range from seedlings to trees 10 inches in diameter. The section of this lot on the south side of the road, which contains about 168 acres, has some growing pines on it but is fenced and being rented for pasturing and is bringing a small yearly income to the town. The Parsonage lot is No. 11 in the 7th range and extends from the 8th range way to the Deerfield line a distance of one mile and contains about 200 acres. This lot runs over nearly the highest part of Saddleback Mountain; the central part is mostly ledge and not valuable. The southerly part of the lot was burned over a few years ago and has but little growth on it, but the northerly half is well covered with growing pines and hardwood. The value of these lands has been estimated at $3,000. At the town meet-

ing held in 1925 it was voted to raise $175 for improvements and 10,000 pines were planted during the following spring. The town forest committee with Mr. Orrin M. James, Chairman, was made permanent and is co-operating with the Forestry Department for continued efforts and further progress.

Hanover.

Many years ago the Hanover Water Works and Dartmouth College made plans to acquire a sufficient water supply for Hanover by purchasing several farms bordering on the old reservoir. This purchase plan was continued until 1325 acres were brought and trees set out along its shores. To date 58,000 trees have been planted and all appear to be growing well. In later years this area will furnish a large town forest from which Hanover should receive a generous income.

The College owns 92 acres of mature pine just north of the old Golf links and bordering the Connecticut River. This tract has recently been thinned, improving its condition and retaining its attractiveness.

Madison.

Two men interested in forestry enabled the town of Madison in 1925 to establish the first town forest in Carroll County. Mr. J. Herbert Burke gave the town 100 acres of land and Mr. William Ford Manley secured an appropriation of $100 by reading to the voters at their meeting the following statement and recommendations:—

"To the Citizens of the Town of Madison:

The possibility of a Town Forest for Madison was first discussed at the Town Meeting of 1924, and a committee was then named to look into the subject and make a report at the Town Meeting of 1925.

Although Carroll County contains more white pine than any other county in the State of New Hampshire there is at present no Town Forest in the county. The supply of this important white pine is diminishing throughout the Town, County and State, and unless the

unexpected happens New Hampshire will soon lose its position as a timber producing State.

The unexpected is that the people of the towns of this State will realize the situation and act promptly to prevent the death of their greatest supply of wealth. Without being pessimistic we doubt if people will do very much at present, in spite of the warning displayed on every cut-over tract and in the rapidly diminishing stands of taxable timber.

It is easier to do nothing at all. It is easier to cut what timber remains—and to let the future take care of itself. It usually does take care of itself, but not always to the advantage of generations to come.

And since the planting of white pine is an act that will not benefit those doing it, we doubt it there can be at present any general enthusiasm for reforestation. The whole project is apt to be dismissed by some as impractical and visionary.

But it cannot be so dismissed by thinking people. Reforestation has been practiced in Europe for centuries, and for centuries the small towns of Germany, France and Norway have had their town forests, supplying them with timber and with a source of revenue; lowering their taxes and furnishing work for the inhabitants.

These town forests are in most cases very old—some have stood over 1000 years. They are in size from 20 to 2000 acres. Some of them make a small return of money; others not only furnish winter-work for the people of the town, but pay all town expenses; and in some cases a dividend as well!

We cannot hope for anything like this in a few years. We all want lower taxes, but very few of us will do anything to secure them, except talk.

The town forest offers a practical way to lower taxes, to provide work for the citizens, and to provide joy in preserving rather than destroying.

Your committee has inserted in the Warrant an article on which you will vote. It is for the raising of the sum of $100 for the purchase of land and small pines for a town forest. This is a small sum, and was made small purposely. The town forest is a project to be carried on from year to year. A small beginning may lead to great things, but there must first be a beginning. And there must also be interest to sustain the idea from year to year, and from generation to generation. No single man or group of men can do it for you. It is for the benefit of the Community, and if it is to be a success the Community must take hold.

Your Committee found that there is no land in the town taken over for taxes.

Your Committee found no poor farm.

The town owns no suitable land.

Therefore the land for a town forest must be purchased or acquired through gift.

Your committee has communicated with four land owners hoping to secure a tract of cut-over land suitable for reforestation, but has not been successful in getting what seems to be a proper tract of land. However several months remain before the planting season, and there is no doubt that a tract of ten or more acres, can be purchased and set out with 1,000-2,000 trees before June.

The Committee has tried to secure land that is:

1. Suitable for white pine.
2. Located so that it is accessible.

If the money is voted there is no doubt that the land can be secured.

Your Committee hopes that if this project is taken up it will stimulate citizens to give to the town either now or in their wills certain tracts of land, so that in a period of years the town forest will cover not ten, but five-hundred acres. It also hopes that the Town will make this a continuing policy and will from time to time add to and enlarge its timber holdings.

To do so means prosperity in the future. To do so means a legacy for your children and their children. It is easier to do nothing; easier, but not always wiser.

Every town must stand or fall not by its ordinary deeds, but by the unusual things it will undertake. The Town of Madison has a record for progress. It has dared to undertake the unusual, and it has accomplished much. Your Committee hopes that it will be the first town in Carroll County to establish a Town Forest."

This year Mr. Burke has deeded to the town three additional parcels of land adjoining the 100 acres which he gave in 1925; making a total of about 158 acres which the town of Madison now owns. It would be a fine plan to have copies of Mr. Manley's statement read at other town meetings where interest in forestry is lacking and the need great.

Alton.

Mrs. William M. Levy, whose summer home is in Alton Bay, N. H., helped to save eight acres of beautiful pine woods from being cut for lumber during 1923. This grove of Norway pines lies between the main highway and the Merrymeeting river and commands a remarkable view of

Lake Winnepesaukee and the distant mountains. The Alton Board of Trade and interested citizens also raised funds to purchase this attractive camping and recreation ground. The town accepted this gift at town meeting 1924 and a bronze tablet in memory of Charlesworth Levy, son of Mrs. Levy, was dedicated October 12, 1925 when State and Town officials were present.

Wakefield.

The town of Wakefield acquired its town forest within the space of two years and without any outside assistance. At town meeting in 1924 a town forest committee was appointed to investigate and report the following year. In 1925 this committee in its report stated that it had located 100 acres suitable for a town forest on the main highway and asked that $400.00 be at once appropriated. This amount was granted by the voters without any protest. Within a short time the lot was purchased, surveyed and 2,000 trees planted during the spring. The boundaries are all marked and an appropriate sign made to call attention to this Town Forest Reservation. Mr. S. H. Paul, Chairman of the Town Forest Committee, has made a good beginning and hopes to do more planting within a short time. This town has achieved a record for quick action and thoroughness in acquiring its town forest.

Portsmouth.

About 1886 Portsmouth voted to acquire a sufficient water supply and steps were taken to purchase farms and tracts of woodland near known springs along the Portsmouth-Newington town line. A pumping station and reservoir were built and water piped into the city. Two other tracts of land were later acquired for reservoirs nearer the city making over 200 acres. Little attention was paid to the forest growth until recently when an investigation revealed that more than half of this land was covered with a valuable pine growth. Other open pasture land of little value

was noted. Last year Mr. K. E. Barraclough, who was Rockingham County Blister Rust Agent, interviewed Mayor Dale and the Finance Committee acquainted them with existing conditions and recommended that an appropriation at once be made to improve these forest lands. Action was taken and $500 was appropriated in the spring of 1926. Already 10,000 trees have been planted on old fields and Mayor Dale hopes to continue the work of improving its city lands next year. In addition to these lands the city owns Pierce Island of 27 acres in Portsmouth Harbor which is admirably adapted for picnic and recreational grounds. To date the city owns 240 acres of land estimated to be worth $26,000. Surely $500 is a small sum to protect and improve these desirable holdings.

Milton.

In 1839 the town of Milton acquired a poor farm of 140 acres to care for the needy. At that time and for years after the land remained mostly open pasture and mowings. Later pines began to seed in and little effort was made to keep them out. This natural regeneration proved to be of value to the town for during the past 15 years about $15,000 has been realized through the sale of timber. This money has been used by the town for building sidewalks, improvements to highways and town buildings. The town received rent for the use of the farm house and within a few years more timber will mature to help keep the taxes down. At the present time there are about 125 acres of forest land and 15 acres of pasture with a valuation of about $2,000. Had the town of Milton ten times this acreage and ten times the volume of timber, its officers might be able to realize sufficient funds to pay all the town's expense except for schools and roads.

Richmond.

Mr. Ralph L. Morgan has helped the town of Richmond to improve its town forest. He established a forest tree

nursery of his own giving 17,000 pines which were set out on an old farm within the 100 acres which Richmond now owns. Mr. Morgan hopes that this area will soon be increased and he will raise all the trees necessary and give them to the town for planting. His influence for forestry extends beyond the boundaries of Richmond as he is the chairman of the town forest committee of Fitzwilliam and is making the towns in his section realize the advantage of this progressive movement.

Grantham.

The town of Grantham was laid out about 1800. It was customary to allot one 100 acre lot for the support of the minister and one lot for the schools. For many years timber was cut and given for these purposes. The townspeople gradually lost interest in these lands as they were located on Grantham Mountain and were rather inaccessible. The minister got his wood nearer home and the schools had appropriations made at town meeting for their use. Few people realized that these two lots still existed. Several years ago lumbering began on Grantham Mountain adjacent to the town's lands and several interested citizens insisted that some of the timber had been cut and removed. Fortunately for the town a surveyor who had been born in Grantham and raised there was hired to look up the old deed and search the town records. It was found that the town had never sold or parted with these lots. After weeks of careful surveying with the assistance of the selectmen some of the original corners were located and checked by measurement to a rod. Some of the best timber had been cut. The operators were asked to check the deeds and surveys which were done and latter a settlement to the town was made for $1,100. The town estimates that the value of the timber still uncut is worth $3,000. Grantham can rest assured that no further attempts will be made by lumber operators to cut timber adjacent to the town lots without due care.

Concord.

From 1813 to 1827 the question of the best manner to deal with pauperism was the subject of careful deliberation by the citizens of Concord. The system of bidding off the poor of the town to whoever would provide for them at the lowest rate was not even the most economical. For several years it was considered that the town should purchase a Poor Farm. At the annual town meeting held in 1827 this project received the sanction of the voters: "That the Town will purchase a farm on which the poor of the town shall be supported." A committee was appointed to report the next year which they did, recommending the purchase of the Timothy Walker farm near the West Parish village. The farm contained over 200 acres of land, 100 acres of which was covered with a large quantity of valuable timber and much wood. The total cost for this farm was $4,484.00. The poor of the town were housed here and the timber cut from time to time realizing good financial returns for its sale. For 55 years this farm was managed successfully until in 1883 when the voters of Concord which has now become a city decided to sell at auction the farm land and buildings. The highest bidder gave $6,700.00 and the city kept its forest lands then valued at $3,000.

During all this period the town and later the city depended upon wells and springs for its water supply. The springs at the base of Sand Hill were thought of as a source of supply. At one time a person called Amariah Pierce was supplying customers with spring water by an aqueduct of white pine logs 12 feet in length and 6 to 8 inches in diameter, bored with a pod-auger. In 1849 the Torrent Aqueduct association was chartered for supplying water to customers. In 1859 agitation began for the piping of water from Long Pond to the city. This discussion continued until 1870 when a mass meeting was held in Eagle Hall to talk over the situation and decide upon some definite plan. The citizens realized that further progress and growth of

the city was dependent upon an adequate water supply both for house use and fire protection. After long debates the City Council in 1872 voted to appropriate $175,000 for this purpose. Concord then boasted about its horse-car service, a fire department and adequate water supply from Long Pond to all city homes. To protect the water supply it was deemed essential to buy land bordering on the shores of Long Pond. The Water Board has been purchasing parts of old farms and woodlots for many years until 400 acres are now owned by the city. In 1895 Supt. Hastings bought 3,000 white pines and after plowing the open land planted these trees 20 feet apart. Several years ago the lower branches were pruned and the brush burned. Today this 31 year old plantation, one of the oldest in the state, has an average diameter growth of about 15 inches. In 1907 Mr. Philip W. Ayres, Forester for the Society for Protection of New Hampshire forests examined the timber lands and made a valuable report. In 1907 Mr. Percy R. Sanders became Supt. and he started to reforest all the open lands that were then owned by the city about Long Pond. Two thousand trees were set out on one of the pasture lots. During that same year he bought 25 pounds of pine seeds, sowed the seeds in beds and began his forest tree nursery. During the winter spare men were put to work cutting out hardwoods and releasing the growing pine. At the January meeting in 1913 at which the Water Board, Park Commission and City Government met jointly, it was voted to have Mr. Silas S. Wiggin make an estimate of some timber which the city had decided to cut. Mr. Wiggin reported 500 M. board feet which was sold together with several other small blocks of pine which enriched the City Treasury by $16,000. Mr. E. C. Hirst at that time State Forester made a report and assisted in this work. Reforestation kept apace with the cutting for 31,000 pines were purchased from the State Nursery and planted on some pasture land on the east shores of Penacook Lake. During the next five years over 100,000 pine trees were planted on city property, the supply

being taken from its Forest Nursery. The city now owns 400 acres of forest land entirely surrounding Long Pond with an estimate of over 2,000 M. feet of merchantable pine. This whole property is valued at $50,000. For exactly 100 years the town and city have owned forest land, cutting timber and reforesting its lands and have proven beyond a doubt that forestry is essential for the best management of this type of property.

Durham.

Several towns have received gifts of forest land due to certain individuals interested in town welfare. The late Olinthus Doe of Durham gave 65 acres of his farm in 1900 for forestry purposes. In 1905 about 300 M. feet of large white pines were cut and sold for $2,000.00. Since that date 15 acres of open land were planted. It is estimated that at the present time there are 100 M. feet of merchantable growth which could be cut. Within recent years the town received an offer to sell its town lands and there were some who advocated its sale; but at town meeting the offer was rejected as the citizens felt that this tract may possess value other than its present timber holdings. The valuation of the 65 acres is estimated to be $1,125.00.

FOREST FIRE PROTECTION.

Review of Forest Fire Conditions.

There is little authentic record of fire conditions prior to the organization of the Forestry Department in 1909. Since the days of land clearing and settlement fire has been a powerful weapon for good or evil. Land owners who repeatedly burned their fields and hillsides however, had little knowledge of or regard for the damage done to the soils. The habit of unrestricted burning handed down from one generation to another became almost a vice. When the greater part of southern New Hampshire had become either cut over or cleared, burning was still such a factor that scarcely a piece of woodland did not suffer at frequent intervals from fire. Many areas which for many years now have been splendidly forested are known by the older residents to have been covered with charred stumps and blueberries 75 years ago. With the abandonment of many back farms on poor soils and the gradual reseeding of these areas to forests a change in the attitude toward burning was manifested. In fact fires which had previously been small in size easily became wide spread as land was thrown out of agricultural use. Buildings became endangered which years before had been protected by stretches of open land. Along the railroads a new cause of fires became apparent from the sparks from locomotives. With the passage of years down to our more recent conditions we have seen second growth forests grow to maturity and cut into lumber, leaving slash of the most dangerous kind.

In the White Mountains and more remote forest regions which were not lumbered for the first time until relatively late, fires have been much more recent. It is well known that green timber especially when mature is not only less injured by fire but often serves as a barrier to stop its progress. Serious and extensive fires resulted when these

forests became filled with slash from lumbering. The first forestry report of 1885 estimated that between 1860 and 1885 more valuable forest property had been burned over than ever before that time and that the losses were more than the Civil War debt of the state. It gave the causes chiefly as clearing land, carelessness of hunters and fishermen and the recklessness of lawless persons. The records of the more serious fires of the last quarter century have been chiefly in the mountain regions. It is a well established fact that one fire which created more disturbance in the minds of people than any before that time was in 1888 when a great stretch of country covering at least 12,000 acres near Twin Mountain and Fabyans burned over. There were great fires in the vicinity of Franconia and Kinsman. In 1903, a year of extremely dry weather, over 84,000 acres burned in the White Mountains alone and there is no record of the enormous acreage burned elsewhere. One fire in Kilkenny burned 18,000 acres that year. Fires were almost certain to follow lumbering in the mountains but only occasionally were they driven into uncut timber. Fires covering many thousands of acres burned the sandy pine country of the Ossipees and Madison. The forestry report of 1910 estimated 161,000 acres burned over in the White Mountains during the years before.

In publishing the following notes on prevailing fire weather and the tabulated fire record for the past seventeen years, the facts should not be lost sight of that fire hazards have largely increased since 1909 on account of very general lumbering, use of portable mills and abundance of slash, larger forest areas unbroken by open land, roads and green timber and the tremendous increase in recreational uses of the woodlands made possible by the automobile. The earlier records were not so complete as those for the last few years. With increase in values of forest property, there is of course a corresponding increase in damage resulting from forest fires. Conditions favorable to extremely rapid spread of fires come about very quickly but are

usually of short duration. Experience has shown the importance of speed in reaching a fire and bringing it under control with sufficient help. One disastrous fire may easily spoil an otherwise good season's record. There is great need of unabating effort to educate the public to the importance of preventing fires from starting. The best that can then be done is to have an efficient local fire fighting force available on short notice and properly equipped. It is along these lines that further efforts must be directed.

NOTES ON PREVAILING FIRE WEATHER

Period of Seventeen Fiscal Years

1909-1910. Droughts in early spring and midsummer of 1910 in southern part of the state. Frequent rains in mountain region during above periods. Goffstown had 1,090 acres burned; Concord, 1,364; Windham, 2,020. No large north country fires.

1910-1911. Droughts of 35 and 30 day duration respectively coupled with unprecedented hot weather in spring and midsummer of 1911. "When the second drought was broken late in July, New Hampshire had passed through the most dangerous fire year on record." Freedom had 4,110 acres burned; Ossipee, 3,580; Wakefield, 6,595; Berlin, 3,012; Amherst, 1,222; Manchester, 1,698; Merrimack, 692; Milford, 1,240; Nashua, 753; Concord, 3,316; Hooksett, 858; Hopkinton, 1,519; Chester, 707; Northwood, 1,495; Rochester, 859.

1911-1912. Mountain region had 38 day drought. Alton had 1,515 acres burned; Gorham, 1,660; Hooksett, 835; Sargent's Purchase, 1,100.

1912-1913. Notes on character of weather not given in report. Alton had 757 acres burned; Wakefield, 1,544; Manchester, 1,148; Allenstown, 1,025; Concord, 1,631; Hooksett 1,250; Rochester, 774.

1913-1914. No notes on weather. Chesterfield had 1,020 acres burned; Langdon, 851; Sargent's Purchase, 2,000.

1914-1915. Practically all of fiscal year very dry with high winds in most sections of the state. Albany had 3,000 acres burned; Richmond, 1,100; Francestown, 770; Litchfield, 3,500; Manchester, 2,133; Merrimack, 1,517; Warner, 757; Derry, 680; Nottingham, 1,013.

1915-1916. Favorable fall period. Bad period in May 1916 varying from ten days to three weeks in different parts of the state. Very high winds. Concord had 1,280 acres burned; Middleton, 1,000; New Durham, 1,003.

1916-1917. No long periods of drought. In general, season very favorable. No big fires.

1917-1918. Dry, windy period latter part of April and first part of May. Again in July a danger period occurred in northern part of the state. New Ipswich had 2,406 acres burned. Hooksett, 1,673.

1918-1919. Abundant rainfall of 1919. Late spring. Madison had 1,000 acres burned.

1919-1920. Sufficient rainfall in 1918. Little snow and dry early spring of 1919. Hooksett had 852 acres burned.

1920-1921. Favorable fall of 1920. Spring and summer 1921 "undoubtedly the most serious fire period in a great many years, not excepting 1911 and 1915." Pittsburg had 2,030 acres burned; Derry, 640.

1921-1922. Fall of 1921 dry in north country. Exceedingly dry spring in southern part of state. April and May 1922 had 200 fires. Alton had 718 acres burned; Chesterfield, 1,200; Manchester, 1,845; Concord, 1,489.

1922-1923. Not a hazardous year. No big fires.

1923-1924. Hazardous year. Waterville had 2,350 acres burned.

1924-1925. Fall of 1924 very dry. October dryest in 54 years. Two proclamations. Spring 1925 also very hazardous. One hundred forty-one fires in April. Deerfield had 751 acres burned.

1925-1926. Favorable fall of 1925. Spring of 1926 very hazardous—first part of May especially. Hudson had 2,324 acres burned; Merrimack, 643; Pelham, 1,139; Exeter, 750.

TABLE 1

FOREST FIRE RECORD FOR SEVENTEEN YEARS.*

Year.	No. Fires.	Area Burned.	Average Area Burned Per Fire.	Damage.	Average Damage Per Fire.
1910	272	9,038 A.	33.2 A.	$40,000.00	$147.06
1911	462	30,958	67.0	175,000.00	378.79
1912	344	8,474	24.6	62,000.00	180.23
1913	609	14,507	23.8	100,000.00	164.20
1914	315	8,119	25.8	53,000.00	168.25
1915	792	29,480	37.2	174,567.00	220.41
1916	128	6,630	51.8	40,075.00	313.09
1917	197	1,680	8.5	18,205.00	92.41
1918	357	8,693	24.3	94,468.00	264.61
1919	308	3,502	11.4	41,287.00	134.05
1920	138	1,996	14.4	17,681.00	128.12
1921	276	7,172	26.0	59,503.00	215.59
1922	295	9,484	32.1	94,917.00	321.75
1923	199	2,333	11.7	27,786.00	139.63
1924	330	5,351	16.2	83,347.00	252.57
1925	486	8,368	17.2	97,508.00	200.62
1926	295	8,181	27.7	115,614.00	391.91
Totals	5,803	163,996 A.		$1,294,958.00	

Averages Per Fire	26.5 A.	$205.92
Average Number Fires Per Year	341	
Average Area Burned Per Year	9,645 A.	
Average Damage Per Year	$76,174.00	

* Exclusive of railroad fires.

Fire Seasons of 1925 and 1926.

Excepting the fall of 1925, the biennial period just ended has been unusually hazardous from a forest fire protection point of view. The fall of 1924 was very dry, the month of September having been the only month in which well distributed rains reduced the hazard. October dry records for 54 years were broken in 1924. The Governor's authority to close the woodlands was invoked on two separate occasions resulting in proclamations issued to that effect August 7 and October 27. The Spring of 1925 was also very hazardous. An extremely dry month of April greatly retarded the start of green vegetation with the result that 141 fires occurred during that month, exclusive of railroad fires. This probably is the greatest number of fires ever reported for one month. The fall of 1925 was relatively favorable and only 65 fires occurred, exclusive of railroad fires. The Spring of

1926, last six month period of this biennium, was extremely unfavorable and greatly disproportionate area burned and damage resulted. Nearly all of the area burned and damage suffered during the fiscal year ending June 30, 1926, occurred during this Spring period—96% of the area burned and 98% of the damage.

A study of the biennium totals shows that about six-sevenths of the whole damage occurred in three of the ten counties of the state—Hillsboro, Merrimack and Rockingham counties. The damage record of Hillsboro County for the biennium is nearly as great as the damage for the whole state during the fiscal year 1926. The towns of Greenfield, Hudson, Merrimack and Pelham in this county lost over $100,000 through forest fire damage. Three fires in these four towns caused damage of over $90,000. One of these fires, alleged to have been caused by an illegally set fire, caused damage estimated at over $70,000.

The only unusually serious fire of the fiscal year 1925 was in Deerfield April 7, 1925, caused by burning brush for sticking lumber. The fire spread over 700 acres of woodland, causing a damage of slightly more than $13,000, including damage of $3,500 to buildings and $4,000 to stacked lumber. This case was passed on by the Grand Jury but no further action taken.

Three of the four fires of the fiscal year 1926 which are worthy of note all started on May 8, 1926. This date was preceded by a period of nearly two weeks of fair, clear weather with comparatively high temperatures and fresh, drying winds. The last previous rain of importance occurred April 25 when three-quarters of an inch was recorded. This weather was ideal for the spread of forest fires. A fire in Hudson and Pelham alleged to have started from burning brush or rubbish burned over a total of 3,300 acres, slightly more than five square miles. Damage to standing timber was estimated to be nearly $57,000 while buildings, stacked lumber, cut wood and logs suffered a damage of approximately $13,000. This fire was easily the most disas-

trous of the whole biennial period. Three portable saw mill outfits have been in the area salvaging killed timber. The case is still pending in Superior Court.

The Mast Yard fire, so-called, which also started on May 8, 1926, was caused by a locomotive on the Claremont Branch of the Boston & Maine. A total of approximately 275 acres was burned, including 185 acres of the Mast Yard State Forest. The greater portion of this burned state land had been set with young forest trees at intervals during the past ten years. The fire destroyed 107,000 of these young trees and also killed approximately 115,000 board feet of standing merchantable timber. The planted trees were from three to ten years old and many reforestation problems were well on the way to a solution. About one-half of the State's extensive plantation was destroyed by the fire. While the experimental value destroyed can not be replaced short of ten years of further planting effort, a damage settlement covering actual losses after deducting salvage and enabling the Department to re-establish the experimental forest within the next year or two, was made by the railroad.

The Exeter-Newfields fire of May 8, 1926, burned 1,000 acres and caused damage of nearly $10,000. All available assistance was summoned but the weather conditions then prevailing made the fire a stubborn one to control and it was only with great difficulty that a more serious situation was averted.

A serious fire occurred in Merrimack and Bedford on May 3, a short time ahead of the above mentioned period. A careless smoker was responsible for the start of this fire which burned an area estimated at 700 acres—600 in Merrimack and 100 in Bedford. The damage has been estimated at nearly $9,000. Over 500,000 feet of growing pine was killed and it was necessary to operate it at once. This particular lot was in fine growing condition and would undoubtedly have been kept ten more years by its owner. No evidence in either of the last two mentioned fires could be found sufficient to warrant legal action.

Fires which individually caused damage of over $5,000 occurred in Greenfield, Hudson, Merrimack, Pelham, Deerfield, Epping and Exeter-Newfields. Seventy-seven fires each caused more than th e average damage per fire. Four of these occurred in Belknap County; five in Carroll; ten in Cheshire; one in Coos; four in Grafton; 18 in Hillsboro; nine in Merrimack; 24 in Rockingham and two in Strafford.

The average damage per fire during the biennial period was $273. This compares with $210 for the two previous fiscal years. Had it not been for the great Hudson-Pelham fire, the 1925-1926 figure would have been $183. The average area burned per fire was slightly over 21 acres compared to the 14 acre average of the two previous fiscal years. But for the great fire above mentioned, the 1925-1926 figure would have been about 18 acres.

The expense of extinguishing fifty-seven illegally set fires was paid by the persons responsible. Three settlements were thus effected in Belknap County; three in Carroll; six in Cheshire; three in Grafton; twenty-one in Hillsboro; six in Merrimack; ten in Rockingham; three in Strafford and two in Sullivan.

The Department is co-operating with the Northeastern Forest Experiment Station of the U. S. Forest Service along several lines relating to forest fires; namely in coding and transferring to punch cards data from the fire reports of the wardens for the calendar years 1924 and 1925, improving the form of the forest fire report itself and in studying the occurrence and behavior of fires in relation to weather conditions, in which the Weather Bureau is rendering much valuable assistance. All of the co-operative fire investigations, begun during the past two years, will be continued from year to year with the prospect of much benefit to be received in the future. An analysis of the 1924 and 1925 fires has been prepared by Director Dana of the Northeastern Experiment Station which brings out some interesting and startling conclusions not heretofore obtained but owing to the fact that only two years are included in the

analysis, it is deemed best to continue the study two additional years before publishing the results.

The following five tables give in detail the fire records of the past two fiscal years, substantially as given for previous biennial periods.

TABLE 2

NUMBER OF FIRES BY MONTHS
Exclusive of Railroad Fires

Fiscal Year Ending June 30, 1925		Fiscal Year Ending June 30, 1926	
July, 1924	52	July, 1925	16
August, 1924	33	August, 1925	18
September, 1924	2	September, 1925	15
October, 1924	94	October, 1925	4
November, 1924	52	November, 1925	8
December, 1924	0	December, 1925	5
January, 1925	0	January, 1926	2
February, 1925	0	February, 1926	0
March, 1925	23	March, 1926	0
April, 1925	141	April, 1926	68
May, 1925	53	May, 1926	131
June, 1925	36	June, 1926	28
Total	486	Total	295

TABLE 3

FIRE RECORD FOR FISCAL YEARS 1925 AND 1926

Fires Handled by Town Organization

Name of County.	Year.	No. Fires.	Total Acres Burned.	Average Area Per Fire in Acres.	Total Damage.	Average Damage Per Fire.	Total Cost of Fighting.	Average Cost Fighting Per Fire.
Belknap	1925	16	458	28.6	$4,016.00	$251.00	$1,510.90	$94.43
	1926	8	47	5.9	113.50	14.19	149.13	18.64
Carroll	1925	27	656	24.3	6,089.25	225.53	2,725.48	100.94
	1926	12	93	7.8	1,387.50	115.63	70.51	5.88
Cheshire	1925	53	850	16.0	7,272.50	137.21	3,393.82	64.03
	1926	37	425	11.5	5,265.00	142.30	1,259.61	34.04
Coos	1925	14	127	9.1	627.00	44.79	355.87	25.42
	1926	3	102	34.0	244.00	81.33	41.99	14.00
Grafton	1925	27	512	19.0	2,516.00	93.19	1,835.78	67.98
	1926	13	87	6.7	1,027.50	79.04	366.40	28.18
Hillsboro	1925	105	1,205	11.5	25,662.50	244.40	2,800.19	26.67
	1926	83	4,757	57.3	84,505.00	1,018.13	3,394.40	40.90
Merrimack	1925	74	1,569	21.2	11,523.50	155.73	2,920.18	39.46
	1926	40	861	21.5	3,647.50	91.19	897.71	22.44
Rockingham	1925	136	2,618	19.3	37,864.75	278.42	4,874.56	35.84
	1926	69	1,635	23.7	18,062.00	261.77	2,873.95	41.65
Strafford	1925	20	247	12.4	1,485.25	74.26	1,295.21	64.76
	1926	19	141	7.4	1,160.50	61.08	319.56	16.82
Sullivan	1925	14	126	9.0	451.00	32.21	910.19	65.01
	1926	11	33	3.0	202.00	18.35	246.75	22.43
Totals	1925	486	8,368	17.2	$97,507.75	$200.62	$22,622.18	$46.55
For State	1926	295	8,181	27.7	115,614.50	391.91	9,620.01	32.61

TABLE 4

RAILROAD FIRE RECORD FOR FISCAL YEARS 1925 AND 1926.

Year.	Number Fires.	Total Area Burned.	Average Area Burned.	Total Damage.	Average Damage Per Fire.
1925	345	1,109 A.	3.2 A.	$9,534.00	$27.63
1926	271	980 A.	3.6 A.	11,589.00	42.76

TABLE 5

TOTAL NUMBER OF FOREST FIRES, AREA AND DAMAGE BY CAUSES

Two Years Ending June 30, 1926

CAUSES.	Percent Total Number of Fires.	Percent Total Area Burned.	Percent Total Damage Caused.
Mechanical Causes:			
Railroads	44.09	11.21	9.02
Portable Steam Mills	.21	.86	1.36
Human Causes:			
Burning Brush, Grass and Rubbish	9.99	27.21	34.04
Campers, Hunters, Fishermen, Flower and Berry Pickers, Automobilists, Careless Smokers, etc...	23.48	27.17	27.50
Miscellaneous	3.29	2.61	2.10
Incendiary	1.57	4.23	2.54
Burning Buildings	2.43	1.42	.99
Lumbering	1.06	7.48	7.25
Unknown	12.45	17.35	14.82
Natural Causes:			
Lightning	1.43	.46	.38
Totals	100.00	100.00	100.00

TABLE 6

COMBINED FOREST FIRE RECORD

Two Fiscal Years Ending June 30, 1926
All Agencies Reporting

NUMBER OF FIRES

Year.	Town.	Railroad.	White Mountain National Forest.	Total.
1925	486	345	8	839
1926	295	271	3	569
Totals	781	616	11	1,408

AREA BURNED

Year.	Town.	Railroad.	White Mountain National Forest.	Total.
1925	8,368	1,109	22	9,499
1926	8,181	980	3	9,164
Totals	16,549	2,089	25	18,663

DAMAGE

Year.	Town.	Railroad.	White Mountain National Forest.	Total.
1925	$97,507.75	$9,534.00	$20.00	$107,061.75
1926	115,614.50	11,589.00	.....	127,203.50
Totals	$213,122.25	$21,123.00	$20.00	$234,265.25

Forest Fire Fighting Equipment Survey.

A survey of available equipment for forest fire fighting has recently been made by the district chiefs, covering the two hundred and thirty-five (235) towns and cities of the State as well as four unincorporated places of Coos County. A classified summary of the findings is given below to show in a general way the distribution of this available material and the relative ability of towns to cope with fires, insofar as this ability is affected by equipment or a lack thereof. The quantity of equipment in the state is not thoroughly shown as such information is deemed of secondary value at this time. It is understood that a town having an expensive piece of apparatus and being so listed in the classification, almost invariably has supplies of the lesser fire equipment. It also follows that a town listed as a "hand-drawn chemical" town has no motorized pieces or apparatus of a similar nature.

26 Cities and Towns have motor-driven pumpers with booster tanks.

15 Cities and Towns have motor-driven pumpers with chemical tanks.

3 Cities and Towns have motor-driven pumpers without tanks.

30 Cities and Towns have motor-driven chemical wagons.

4 Towns have portable high-pressure motor pumpers with hose.

7 Towns have special co-operative agreements with adjoining municipalities or with precinct and village fire organizations.

6 Towns have hand-drawn chemicals and fire tools.

34 Towns have only hand-chemicals and fire tools.

39 Towns have only fire tools.

75 Towns own nothing.

It should also be mentioned that auxiliary equipment is maintained in towns listed above by the state and private enterprise as follows:

Seven (7) portable high-pressure motor pumpers with hose.

Nine (9) special forest fire trucks or trailers equipped with fire tools.

Lookout Station Construction.

During the biennial period one tower has been completed and three new ones constructed to replace open wooden structures, one new cabin built, and another enlarged and several of the telephone lines materially improved. In 1924 a 50 foot steel tower with enclosed steel observation room 6x6 feet was completed on Cabot Mountain, Kilkenny, (near Lancaster). In 1925 the open top wooden tower on Pitcher Mountain, Stoddard, was replaced by a 25-foot steel tower with an enclosed wooden observation room 10x10 feet.

In the same year a 40 foot wooden tower with enclosed observation room 10x10 feet was built on Jodrie Hill, Milan, also a cabin 10x16 feet and half a mile of metallic telephone line. This was opened as a new station taking the place of Black Mountain, Cambridge, which was closed on account of its inaccessibility and inability to overlook serious fire

territory along the Grand Trunk Railway, necessity for repairs and expense of upkeep. Automobiles can be easily driven to the new station at Jodrie Hill. In June 1926 the open top, wooden tower on Black Mountain in Benton was replaced by a 20 foot steel tower with an enclosed wooden observation room 10x10 feet. The cabin, which was 10x12 feet, has been enlarged by the addition of a room 10x10 feet. This is now one of the best equipped stations in the state. The steel used in the new construction was furnished by a well known New Hampshire concern at a lower price than is possible from regular tower manufacturers who have furnished many of the towers built by the Department, thereby making it possible to continue this class of construction work at about the same cost as in 1914 when the first steel towers were built. Ten more sliding map stands were installed in various stations and considerable new equipment furnished for the various lookout cabins.

As an experiment in telephone line construction about one-half mile of line was built on Green Mountain in Effingham in 1922, 3½ miles on Carrigan and one-fourth mile on Cardigan, using two insulated wires laid on the ground to avoid the pole and tree line construction which is subject to much damage by falling trees and limbs and consequent loss in efficient service. So far this type of insulated wire construction has been found to be very satisfactory. During 1926 one mile has been built on Monadnock and one-fourth mile on South Kearsarge using twin parallel rubber covered conductors covered with hard twisted cotton braid thoroughly waterproofed. This type of line has been found satisfactory and can be constructed with less labor expense than the other types and its use will be continued during the coming seasons where replacement of mountain lines or new construction are necessary. Special repair work has been done on the telephone lines to Osceola and Deer Mountains.

Patrol.

The New Hampshire Timberland Owners' Association has continued since 1911 to be an important agency in forest fire protection in the North Country. For the season of 1925 twenty-eight members representing the ownership of 732,848 acres paid one cent per acre, with which the services of eighteen patrolmen were employed during the entire fire season and five others during the fishing period. The Forest Commissioner of Maine co-operated in the expense of two regular patrol routes. In addition one patrolman was employed jointly by Maine and the Brown Company and another by the towns of Carroll, Bethlehem and Littleton and the N. H. Forestry Department in the Little River Valley, all being under the supervision of W. H. Morrison, Secretary of the Association, who is also district fire chief for the Forestry Department. Nine small fires were extinguished by the patrolmen and 6,074 persons cautioned to be careful of fire in the woods. A total of 22 fires were reported in eight towns with a total of 156 acres of Association property burned.

During 1926 much the same arrangements were maintained by a one cent assessment on 728,594 acres and the employment of 22 patrolmen. The Association already owns one forest fire pump and has authorized the purchase of another.

REFORESTATION.

State Nursery.

The State Forest Nursery has produced more forest planting stock during the past two years than in any previous two years in the history of its fifteen years existence. The nursery now contains seven and a half million trees including all species and sizes of stock, and is in a better position to furnish forest planting stock than ever before. A big increase in the amounts of seed planted during the two previous years makes it now possible under the three and four year rotation to materially increase the output.

As a result of enlargement and improvement of the nursery, bringing about increased production and a lower overhead cost per thousand trees, there has been a marked reduction in the cost of producing the trees. The law requires that trees shall be sold at cost. For the fall of 1924 and spring of 1925, this cost was $8.00 per M. for 4 year transplants and $7.50 for three year transplants. For the fall of 1925, and spring of 1926, the price of 4 year transplants was reduced 50 cents per M. and 3 year transplants $1.00 per M.

The factor of seed cost and quality, always of serious consideration, reacted the present year to offset those other factors which made a lower cost of trees possible the year before. Seed in 1925 cost from $1.90 to $2.60 per pound and figured 29 cents of the selling cost of each thousand of trees. In 1926 seed has cost from $3.50 to $4.50 per pound, or 84 cents of the selling cost of the present year's trees. This is an increase of 55 cents on every thousand trees on account of the item of seed cost, which has to be figured in the prices of trees for the present fall and next spring, which is $7.75 per M. for 4 year transplants, or 25 cents more than last year, and $6.25 per M. for 3 year transplants, or 25 cents less than last year.

The seed situation is both important and uncontrollable. Trees yield a crop of seed when the seasons and conditions are right. The seed of our most important tree, the white

pine, is perishable, being of little value after the second year, and suffers a large loss in per cent of germination from the first to the second years. The requests for white pine makes up about 80% of the demands of forest planters in New Hampshire; although white ash, both profitable and deserving, promises to deprive it of some popularity in the near future.

Increase in nursery production made it necessary to plow and condition seven acres of old, run-out field land previously unused for growing trees. These areas made up of a light loam top soil and a sandy sub-soil grew only witch grass. Before trees could be set it was necessary to kill out the witch grass which was done by plowing and harrowing. It was necessary to then build up the soil by quick growing, soiling crops. Buckwheat was used for this as two and sometimes three crops can be grown each season and plowed under. This amount of humus added to the soil adds greatly to the moisture holding qualities of the soil and is very beneficial to the trees.

The first year of the biennial period two acres by the Daniel Webster Highway and an acre on a higher elevation to the west and in back of the water tank on the hill were set with transplant stock. Two hundred feet of drain tile were used on the area by the highway and the area graded for surface drainage. Surface drainage is necessary on all areas to prevent ice ponds from forming and damaging the small trees where they stay in the ground through the winter.

The following year three more acres were transplanted on the higher nursery area to the west, having been worked and prepared for the trees as the previous area was done the year before.

This last year it was possible to go a step farther in the improvement of adjacent areas for nursery purposes by the assistance given by the Federal Government to State Forest Nurseries through the Clarke-McNary Law. A part of the two thousand dollars from this source was used for pur-

chasing a Fordson tractor with plowing and harrowing attachments and a large dumping scraper. Eight acres more were plowed and harrowed several times and built up with cover crops. Two acres of which are now ready for trees and will be set with transplants next year. The scraper, handling about three times the amount of a horse drawn scraper, was used in grading in and leveling a small ravine that had made an area on either side and adjacent to the back nursery area unfit for use. Next year it is planned to continue with the grading on areas near the highway and now unfit for nursery use because of the poor surface drainage. This will be taken care of as the improvement work this year was done, and will add desirable areas to the nursery. The new land will be used as fast as needed in the rotation which allows every acre to rest one year in three; more cover crops being plowed under for additional humus during the rest year.

A small power cultivator for cultivating the paths between the seed and transplant beds was also put into use this last summer. The total length of these paths is several miles and it is expected that the power cultivator will take the place of considerable man power in keeping them free of weeds. Four lines of over head springling system averaging 350 feet each were installed over the seed beds for taking care of the seedlings during dry weather. Each line is provided with an oscillator which distributes the spray evenly over an area fifty feet in width. The oscillators after being regulated can be run through the night without further care. This makes the system especially valuable as the small seedlings are very tender and cannot be watered under the direct rays of the sun. Previously this work was done by men with sprinkling pots late in the afternoon and evening.

Tables 1 and 2 show the output of the nursery for the past two fiscal years:

TABLE 1

OUTPUT OF THE NURSERY; FALL 1924—SPRING 1925

Species

Age of Stock.	White Pine.	Red Pine.	White Spruce.	Norway Spruce.	White Ash.	Poplar.	Total.
4-year tps. ..	157,235	39,665	28,896	64,625	.....	.....	290,421
3-year tps. ..	182,300	95,800	.....	.....	.....	.....	278,100
2-year sdlgs...	3,000	.....	.....	.....	7,500	.....	10,500
Cuttings	.....	.....	.....	.....	.....	500	500
Totals ..	342,535	135,465	28,896	64,625	7,500	500	579,521

TABLE 2

OUTPUT OF THE NURSERY; FALL 1925—SPRING 1926

Species

Age of Stock.	White Pine.	Red Pine.	White Spruce.	Norway Spruce.	White Ash.	Totals.
4-year tps.	179,850	166,500	43,035	9,350	.....	398,735
3-year tps.	328,450	88,408	.....	.....	.....	416,858
3-year sdlgs.	.....	.....	41,000	.....	.....	41,000
2-year sdlgs. ..	282,500	17,000	.....	.....	10,800	310,300
Totals	790,800	271,908	84,035	9,350	10,800	1,166,893

Two hundred and fifty-one thousand seven hundred and fifty trees of the Fall 1925—Spring 1926 output were used on state land, all other stock shown in both tables being sold to outside parties.

Amounts turned over to the State Treasurer from sale of trees.

Fall 1924	$ 196.95	
Spring 1925	4,364.92	
Total for year	$4,561.87	$ 4,561.87
Fall 1925	495.13	
Spring 1926	4,979.89	
Total for year	$5,475.02	5,475.02
Total for two year period		$10,036.89

SEEDING EXPERIMENTS.

White Pine. The first test of fall seeding was made in the fall of 1922. Six beds were sown in the usual manner of spring sowing. Four by twelve foot frames which practically all nurseries use for broadcast seeding were used, the beds crowned slightly for surface drainage and the seed covered with one-fourth inch of light loam. A mulch of pine needles about one inch deep was placed over the loam to keep the elements from uncovering the seed and to hold moisture after the snow melted in the spring. The seeds germinated early in May which gave the seedlings an unusually long growing season and they seemed to grow especially well during the cool spring and early summer months. Approximately 50 per cent more seed germinated from fall sown beds than from beds sown in the spring with seed from the same source and with like amounts.

The germination was very even, practically every seed breaking the ground at the same time. The mulch at this time was handled differently on the beds to learn what effect it would have on the seedlings. It was entirely removed from two beds, 75% removed from two and 50% from two. The germination stopped entirely in the beds from which all of the mulch was removed, practically stopped in the beds where 75% was removed, but continued where 50% of the mulch was left on the beds. The effect on damping off was very marked. Practically no damping off took place on the beds where the mulch was entirely removed. On the beds where 75% of the mulch was removed a few small areas damped off, which was arrested by removing the mulch around the edges of these areas. Several larger areas damped off in the beds with 50% of the mulch left on, and this was also controlled by removing the mulch around these areas. On the whole the beds from which all mulch was removed were much more satisfactory.

Basswood. The first test with basswood was made by planting seed which had been soaked in warm water for 24

hours, and with unsoaked seed from the same source. The germination of the untreated seed was less than one per cent while that of the soaked seed was about two per cent.

The following year basswood seed was treated with hot water (heated nearly to the boiling point). The seeds were put in a galvanized iron pail and the water poured over them, and they were allowed to stand several hours before being planted. Untreated seeds from the same source were planted at the same time. The result with the untreated seed was the same as before, while the seed treated with hot water germinated about three per cent. Later basswood seeds were stratified in boxes of damp earth and placed in the house cellar where the temperature ranged between 35 degrees and 45 degrees Fahrenheit. These seeds were planted in the spring with only about one per cent germinating.

These results caused us to give up trying to grow basswood at the New Hampshire Forest Nursery.

White Ash. Late in the fall of 1919 several bushels of ripe white ash seeds were collected and stratified in the soil to prevent drying out. This was done by digging a hole in the ground 2 by 3 feet and three feet deep. Burlap bags were then filled about half full of seed and spread out flat in the holes. This made a layer of seed about six inches deep, which was covered with six inches of earth, then another bag of seed and so on until the holes were full of alternate layers of earth and bags of seed. The seeds were left stratified in this way until the following spring when they were dug up and planted in drills.

The planting was done about the middle of May when the conditions for germination were nearly perfect. The seeds were planted in double drills an inch and a half apart with five inches between double rows. A small percentage germinated in a very short time, the rest remained dormant until the following spring when it came up early and evenly, and while the exact per cent of germination is not known it must have been well over 75 per cent.

VIEWS OF PLANTATION ON SENTINEL MT. RESERVATION, PIERMONT, N. H. UPPER LEFT SHOWS NORWAY SPRUCE. UPPER RIGHT, WHITE PINE. BELOW, NORWAY SPRUCE.

Previous to that time ash seeds were planted in the nursery without being stratified. The results from earlier plantings were very unsatisfactory as only a very small percentage germinated.

Planting on State Land.

While is was necessary to curtail state land planting for a few years pervious to 1925, it was considerably increased the fall of 1925 and the past spring season. A planting program of 250 thousand trees was laid out, and 251,750 pine and spruce were planted on nine state forests and two reforestation tracts. Many areas on these tracts were partially covered by natural seeding, and did not need the usual number of trees per acre. In some cases only a few hundred trees per acre were needed to make the stand complete. This work is called filling in, and while the cost per acre is less, the costs figured on the thousand basis are higher in proportion than in straight planting. In all 338 acres were covered and brought to the desired density. Of these eighty acres were set in the fall with 52,000 trees and 258 acres in the spring with the remaining 199,750 trees.

Table 3 shows the species and number of each set on various state tracts, together with the acres covered on each tract, Fall 1925 and Spring of 1926.

TABLE 3

PLANTING BY TRACTS: NUMBER AND SPECIES

Tract.	Acres Covered.	White Pine.	Red Pine.	White Spruce.	Totals.
Annett	33	21,500	.....	.....	21,500
Cardigan Mountain	30	.....	.....	18,000	18,000
Huckins	38	.....	38,500	.....	38,500
Kearsarge Mountain	79	39,000	.....	30,000	69,000
Litchfield	49	4,000	26,000	.....	30,000
Nottingham	10	6,250	.....	.....	6,250
Nursery	26	18,000	500	.....	18,500
Redstone	30	.....	26,000	.....	26,000
Scribner Fellows	35	12,750	5,000	.....	17,750
REFORESTATION TRACTS					
Robie	2	2,000	.....	.....	2,000
Sumner	6	4,250	.....	.....	4,250
Total	338	107,750	96,000	48,000	251,750

SUMMARY OF COSTS

No. trees planted	271,750	No. acres covered	338
Cost setting per M.	$7.69	Cost setting per acre	$5.89
Cost trees per M.	6.14	Cost trees per acre	4.58
Complete costs per M. ..	$13.83	Complete costs per acre	$10.47

Cost of a Typical Planting Operation.

Many inquiries are made as to the cost of planting a thousand trees or an acre of land, and to help such interested parties; actual figures of a typical operation are shown in the following tabulation of operation costs. This operation took place only a few miles from the nursery, in a rough open pasture from which a stand of timber was previously cut. It is very similar to plantings made by woodlot owners except that express on trees should be charged at $.50 per M. and overhead charges deducted when owners help with the planting. In this case the trees were taken by auto when the man in charge started the work.

TABLE 4

COST OF TYPICAL PLANTING OPERATION

Trees Planted

Species.	Number.	Rate per M.	Amount.	Total Amounts.
White Pine 3 year tps. ...	4,250	$6.50	$27.62	$27.62

Costs of Operation

Items.	Amount.	
Wages, Man in Charge	$2.00	
Travel, Man in Charge	1.60	
Wages, Labor	19.17	$22.77
Total Planting Expenditures		$50.39

Unit Planting Costs

Items.	Cost per M.	Cost per Acre.
Setting	$5.33	$3.79
Trees	6.50	4.60
Complete Reforestation	$11.83	$8.39
Number Acres Planted		6
Number Trees per Acre		675
Spacing		8′ x 8′

Size of Stock Best Adapted to N. H. Conditions.

There has been much discussion among foresters and advocates of tree planting, as to the most economical tree to plant for establishing forest growth; namely four year transplants, three year transplants, or two year seedlings. This difference of opinion among so called authorities has caused those seeking information to be given from time to time, conflicting and confusing advice. This confusion leads many times to indecision and postponement of previous well developed planting plans.

Four year transplants will average about eight inches in height and cost about $8.00 per M. Three year transplants will average five inches in height and cost about $6.50 per M. Seedlings will average three inches in height and cost about $3.50 per M. Both sizes of transplants have abundance of roots developed by being transplanted in the nursery. The height of the four year transplant is sufficient to enable it to cope successfully with any reasonable amount of cover, and will come through where it is possible for any kind of reforestation stock to grow. The three year transplants, satisfactory on many sites, have proved unequal to such conditions as blueberry sod, extremely light and exposed areas, heavily burned soils, and in places where the grass or cover is so dense and rank as to completely obliterate and choke out the trees. This is not always noticeable until after the cover dies down in the fall when the weight on top of the tree will flatten it to the ground and together with the damp unhealthy condition underneath this cover cause its death.

The two year seedlings, smaller in size and less in number of roots, are more sensitive to surrounding conditions. Their small cost makes it always worthy of consideration, but after planting them on state lands under all conditions for several years, they do not prove economical for general planting. They have however come through on old fields and pastures where the cover was not too dense and rank,

on sprout areas of moderate density, and when used for under planting where the growth on the land is afterwards to be removed.

Believing that prospective planters will be interested in experiments conducted by the state to determine the relative value of the different sizes of stock, the following table is published showing the per cent of each kind living at the end of the first year after planting, the average amount of growth made by each class of tree, and also the relative value of fall and spring planting under similar conditions. Past experiences have shown that red or Norway pine cannot be set successfully in the fall, or white pine on exposed areas. The plots chosen for the experiment at Kearsarge Mountain were identical in every way except that areas planted in the fall seemed to be less fertile and possibly did not hold the moisture quite as well as areas chosen for spring planting. These are the only reasons, it is believed, that the fall set stock made less growth than the stock set in the spring. Two fields side by side with a southern exposure and protected on all other sides were chosen. The stock used both fall and spring were from the same source and of average size; as was also the stock used on the Redstone and Huckins tracts. The Redstone area where the experiment was conducted is what would be termed an ordinary planting site. A light sandy soil with a sparse covering of sprouts, low blueberry on some areas and some areas of low dense grass. The seedlings were not set on the blueberry or grass turf however, and would have shown a much heavier loss if they had been. The whole area was subject to drought, and was burned over five years ago.

The Huckins experiment is on an area where it is somewhat difficult to establish a stand of trees. The soil is light and gravelly, was burned over a number of years ago and is covered with scrub pine, dense stunted grey birch and low bush blueberry. Here again the seedlings were on a site practically free of the heavy blueberry turf.

TABLE 5

LIVABILITY AND GROWTH

Season Planted	Tract.	Species.	Stock.	Percent Living.	1st Year Growth—inches.
Fall 1925	Kearsarge	W. Pine	4 yr. tps.	93.5	2.48
Fall 1925	Kearsarge	W. Pine	3 yr. tps.	82.5	1.83
Fall 1925	Kearsarge	W. Pine	2 yr. sdlgs.	82.	1.47
Spring 1926	Kearsarge	W. Pine	4 yr. tps.	97.9	3.56
Spring 1926	Kearsarge	W. Pine	3 yr. tps.	86.8	1.97
Spring 1926	Kearsarge	W. Pine	2 yr. sdlgs.	81.5	1.65
Spring 1926	Huckins	R. Pine	4 yr. tps.	97.2	3.63
Spring 1926	Huckins	R. Pine	3 yr. tps.	87.1	2.67
Spring 1926	Huckins	R. Pine	2 yr. sdlgs.	57.5	1.81
Spring 1926	Redstone	R. Pine	4 yr. tps.	96.1	3.83
Spring 1926	Redstone	R. Pine	3 yr. tps.	90.3	2.77
Spring 1926	Redstone	R. Pine	2 yr. sdlgs.	51.3	1.91

These areas will be gone over again two and four years hence and data taken to show final results. Data taken after five years growth should be quite conclusive as to relative values.

WHITE PINE BLISTER RUST CONTROL.

That the control of the white pine blister rust disease has been successful is due, in a large measure, to the support accorded this necessary work by the Legislature since 1917, and also to the co-operation of cities, towns and individuals since 1918.

Beginning in 1917 with modest demonstration control areas aggregating but 23,090 acres, (the cost of which was borne by the State and Federal governments), there has been a steady growth in interest and area protected, until at the end of the calendar year of 1924, through the co-operation of 167 towns and cities, and 464 forest owners, the control areas totaled 1,360,312 acres.

CO-OPERATIVE CONTROL WORK—1925 AND 1926.

1925 Control Work

In 1925 there were 78 towns and cities making appropriations of $32,725.00 for blister rust control in co-operation with the Forestry Department. The following tabulation is of interest since it indicates the range of municipal appropriations.

TABLE 1

Number Towns and Cities Appropriating Certain Amounts

$100	200	300	400	500	525	600	1,000	1,200	Total
3	6	1	55	6	1	2	3	1	78

As a further evidence of the interest in blister rust control, and the public spirited efforts of citizens to assist the towns and State, mention should be made of the activities of Mr. R. L. Morgan of Richmond and Mr. H. B. Moulton of Lisbon. In the former town Mr. Morgan and others financially supported control work until the entire pine area of

Richmond was covered. His interest did not terminate with the completion of control measures in his own town, for during 1925 he and a number of others raised among themselves the sum of $403 and turned it over to Fitzwilliam, thus increasing the local appropriation. In Lisbon, Mr. Moulton increased the town funds $100.

Control work was also carried on with 30 individuals and firms, the amount subscribed totaling $2,129.41. The largest amount appropriated for private control was made by Mr. O. B. Brown, Vice President of the Brown Corporation.

The towns of Hampton, Jaffrey, Newmarket, Stratham, and the City of Franklin made available funds for a re-examination of their pine areas as several years had elapsed since the completion of the original work. Control measures were also conducted on 12 State Forests; while the United States Forest Service put under protection several areas in the town of Benton.

The total of all control areas worked in 1925 amounted to 261,430 acres, upon which 3,275,006 currant and gooseberry bushes were destroyed at costs ranging from $0.08 to $0.99 per acre, the average for all areas being $0.17. Owing to re-eradication measures being conducted in five towns there should be a deduction of 41,734 acres from the year's total, thus leaving 219,696 acres of new work.

1926 Control Work.

The final returns from towns and cities indicated that 81 had made appropriations aggregating $33,375.00 or $650 in excess of the total for 1925.

A classification of 1926 appropriations follows:

TABLE 2

Number Towns and Cities Appropriating Certain Amounts

$100	125	150	200	300	400	500	600	800	1,000	Total
2	1	1	3	2	61	6	1	2	2	81

As in former years Mr. R. L. Morgan indicated his interest in blister rust control, and with five others made avail-

able $120 to supplement the appropriation by the Town of Fitzwilliam. The Parker Young Company, through its president, Mr. H. B. Moulton, increased the Lisbon town funds $100. The International Paper Company and another land owner added $150 to the Marlow appropriation.

Funds for re-eradication were appropriated by Bow, Dover, Durham, Hampton, Jaffrey, Newfields, Newmarket, Rollinsford and Stratham. Several individual areas, worked some years ago, were re-eradicated by their owners in cooperation with the Forestry Department. In addition to private funds put up to augment town appropriations, 19 persons, firms and associations made available $2,788.64. The United States Forest Service carried on several small projects, the expenditures amounting to $90.62. An addition of 115 acres to the State Forest Nursery was examined as well as 228 acres on the Kearsarge State Forest in Wilmot.

A summary of all eradication projects carried on during 1926 indicates that 210,002 acres were examined and 3,116,472 currant and gooseberry bushes located and destroyed. Re-eradication areas, both town and individual, amounted to 32,046 acres upon which 160,165 bushes were destroyed, thus leaving 177,956 acres of new work.

A re-capitulation for 1925 and 1926 shows a total of 397,652 acres and 6,117,686 currant and gooseberry bushes. The addition of all control work prior to 1925 gives a grand total of 1,757,964 acres and 22,469,756 bushes destroyed.

Character of Eradication Work.

In order to determine the thoroughness of eradication work it has been the practice to carry on checking of representative areas by State inspectors as well as by the county blister rust agents. The character of land inspected embraces all varieties of forest types such as slash, pasture, uplands, swamp, brook courses, stonewalls and roadsides. The following table indicates the results of these checks.

TABLE 3

RESULTS OF CHECKING CREW WORK

Checks Made by	Number Checks.	Area Covered.	Bushes Pulled by Crew.	Bushes Found by Inspectors.	Percent Pulled by Crew.
Inspectors	651	3,102.95	307,480	4,483	.985
Agents	637	2,856.25	334,307	3,927	.988
Totals	1,288	5,959.20	641,787	8,410	.987

As the State inspectors made checks in 64 out of the 81 towns, the results of their examinations represent a fair criterion of the quality of the work performed by the eradication crews. Many checks were made by the district agents in towns not examined by the inspectors. Considerable inspection of crew work was also made by local inspectors appointed by the Boards of Selectmen.

Control Measures on State Lands

The Forestry Department has not lost sight of the importance of control work on the various State forests and reforestation tracts. Every agent of the Department when on State land is expected to observe blister rust conditions and report all infections seen, as well as to pull up currant and gooseberry bushes as far as he is able. It has been the policy in the past to carry on systematic eradication work on State lands whenever crews were located in the vicinity and engaged in similar work on town and private land. In this way part of the Monadnock, the Haven, Huckins, Everett, Mast Yard, Litchfield, Salmon Falls, Scribner-Fellows, Alton Bay, Taylor, Beech Hill, Caroline Fox and Redstone State Forests have been covered, as well as the Geo. D. Pattee, Chas. H. Pattee, Leighton, Tilton, Young, Palmer and Sumner reforestation tracts. The State forest nursery and surroundings to the extent of 1,011 acres were thoroughly eradicated in 1918 and re-examined at frequent intervals since. The first cost was $91.52 and 5,000 bushes were removed.

During the past four years a number of the State forests have been cleaned up by special eradication crews with the result that control of the blister rust disease is well in hand on all the State forests. The following table may be of interest to show the cost, acreage covered, and ribes destroyed on State forests by special crews since 1923.

TABLE 4

SPECIAL STATE LAND ERADICATION

Year.	Name of Tract.	Total Cost.	Acreage.	Cost Per Acre.	Ribes Destroyed.
1923	Honey Brook	$65.79	464	$0.14	3,585
"	Dodge Brook	82.23	62	1.32	6,526
"	Annett	170.22	1,092	.15	1,373
1925	Piermont	169.53	186	.91	37,827
"	Mascoma	99.56	174	.57	12,238
"	Jeremy Hill	16.38	63	.26	40
"	Ponemah	12.46	63	.19	.....
"	Russell-163	3.92	18	.21	.....
"	Pawtuckaway	105.04	700	.15	4,289
"	Harriman-Chandler .	79.50	405	.19	2,119
"	Craney Hill	7.75	31	.25	1,075
"	Contoocook	15.00	30	.50	41
"	Barnard	80.47	12	6.70	23,450
"	Walker	10.11	47	.21	51
"	Davisville	20.72	32	.64	1,430
1926	Kearsarge Mt.	86.42	294	.29	5,246
"	Nursery-Salisbury ..	20.16	115	.17	132
	Totals	$1,045.26	3,788	$0.275	99,422

In addition to the above, the Glencliff Sanatorium, of 506 acres, was worked in 1924, at a cost of $116.62, and 4,900 ribes were eradicated.

Distribution of Blister Rust on Pines.

Infected white pines are becoming increasingly evident throughout areas where the removal of currant and gooseberry bushes has not been undertaken. Scarcely a lot examined during the past two years has been found to be free from infection. During the summers of 1925 and 1926 a total of 32,883 pine infections were reported by the crew foremen. In some instances the reports referred to single trees, but in most cases a single infection consisted of several pines or a number of acres. These figures do not include outbreaks located by the district agents or members of the Department.

BLISTER RUST ON WHITE PINE. SEVENTY-FOUR PER CENT INFECTED; TWENTY PER CENT WILL BE DEAD IN TWO YEARS. CROSS AND BANDS INDICATE INFECTION.

In the town of Bath an infection survey was conducted in nine blocks; strips one rod wide and 1,000 feet apart being run across these areas. The total length of these strips were 15.36 miles. The infection ranged from 3.1 to 63.3 per cent; the average being 22.7. Attention should be called to the wide interval between strip lines, for it is evident that only a small proportion of the pines were examined. Had the entire pine areas of these blocks been inspected, it is quite likely that a much higher per cent of infection would have been found.

On Currant and Gooseberries.

From observations, as well as field reports, it appears that in no year since the inception of blister rust control, with the exception of 1918, was there so heavy and widespread infection on currants and gooseberries as in 1925. According to the reports of the district agents better than 80 per cent of both wild and cultivated bushes were infected. From early June until well towards the termination of the eradication season considerable rain fell. Such a condition points to the conclusion that 1925 may rank with 1918 in the amount of new infection.

Owing to lack of rain infection on currants and gooseberries was not nearly so great during 1926 as in the previous year. Blister rust is dependent upon moisture for its development and spread from pines to ribes, or ribes to pines.

County Blister Rust Organization

Since the late spring of 1922, through funds provided by the Bureau of Plant Industry, U. S. Department of Agriculture, an agent, representing the State and Government, has been located in each county, with the exception of Coos. At the inception of the new blister rust educational program, ten agents were employed, but owing to the experience of four years it has now been found that this work can

be effectively carried on by eight men. The following table indicates the names of the blister rust agents and their district.

TABLE 5

COUNTY BLISTER RUST AGENTS

Name.	County.	Headquarters.
Frederick J. Baker	Cheshire	Farm Bureau, Keene
Stephen H. Boomer	Carroll	Farm Bureau, Conway
Thomas L. Kane	Grafton No.	Farm Bureau, Woodsville
G. F. Richardson, Jr.	Grafton So.	Billings Block, Lebanon
Clarence S. Herr	Hillsboro	Farm Bureau, Milford
Thomas J. King	Merrimack	Farm Bureau, Concord
Lewis C. Swain	Rockingham	Farm Bureau, Exeter
William J. Cullen	Strafford	Farm Bureau, Rochester

It should be mentioned that Sullivan County has been divided into three districts of five towns each, and annexed to Cheshire, Merrimack and the district known as Southern Grafton. In addition to Cheshire County, Mr. Baker now supervises blister rust control in Acworth, Charlestown, Langdon, Lempster and Washington; Mr. King has added to Merrimack County, the towns of Claremont, Goshen, Newport, Sunapee and Unity, and Mr. Richardson the balance, namely, Cornish, Croydon, Grantham, Plainfield and Springfield. Mr. T. L. Kane supervises any work in Coos County in addition to twenty towns in the northern portion of Grafton. Mr. William J. Cullen also handles blister rust work in Belknap County.

In addition to advice as to the appearance and means of control of the blister rust disease, the district agents have given considerable service in general forestry matters. Inspection of woodlots, advice in forest planting and timber estimating number among the more important projects which these men have handled aside from their regular duties.

Since 1922 blister rust control agents have held 1,417 public meetings; some being indoor and others field meetings. The total attendance at both classes of meetings was 59,280

persons, most of whom are residents of rural districts. The agents have interviewed through personal calls and individual demonstrations of blister rust 21,504 persons.

The co-operation accorded blister rust control from all classes of associations and organizations has been most gratifying indeed. The Farm Bureaus and subordinate Granges, Chamber of Commerce and Women's Clubs are among the more notable organizations interested in this work. During the past two years, which was also true of former periods, the State Farm Bureau Federation and the State Grange passed resolutions emphasizing the seriousness of blister rust and stressing the necessity of control measures. It should also be mentioned that many of the county agricultural organizations have gone on record with similiar resolutions.

Necessity of Continuing Control Measures

A total of 179 towns and cities have, since 1918, appropriated funds for control measures, and of this number 42 have pursued the work until their pine areas have been covered the first time over. There are many towns in which work is so well underway that from one to two years more will see the initial eradication completed. There are 37 towns which have never appropriated funds for control work, although in 19, individual pine owners have co-operated with the State. In a large majority of these 37 towns are excellent and extensive pine areas which ought to receive protection from blister rust.

One of the most serious consequences of blister rust, and yet one in which it is difficult to arouse interest, is the damage that is being done to the future crop of white pine. In many towns, where little or no control work has been performed, blister rust has killed young reproduction to such an extent that it is difficult to locate any considerable areas of seedling pines. While this situation may cause

little concern to the adult of today, it is a matter of serious import to towns and to the State. In spite of reforestation and careful and conservative logging methods little can be accomplished in the regeneration of forests if the lavish reseeding of nature is allowed to be destroyed. Properly protected from blister rust there is no reason why white pine should not continue to produce its quota of wealth to the towns and the State as it has done in the past.

NEW LEGISLATION IN 1925.

Two years ago the Legislature approved a number of minor changes in the forest laws recommended by the Commission to Codify the Public Laws. Woodlands were definitely defined in connection with kindling fires without a permit. The district fire chiefs were given the same power of arrest as wardens and authority to close mills operating in violation of law in cases of emergency. The penalty for violation of the seed tree law was made a straight fine. The section placing fines with the State Treasurer for use in fire prevention and suppression was repealed.

The legislature also made a number of amendments to the forest laws which became a part of the revised public laws of 1925 and should be mentioned. All portable saw mills required to be registered, the operators to secure permit before operating at each new location, and the State Forester to exercise more control over the operation of portable mills and spark arresters and the removal of slash.

All stumpage owners cutting timber within the state, except cordwood and pulpwood to make a report in January giving the amount cut the preceding calendar year in softwoods and hardwoods.

A change in the roadside tree law placing the appointment of tree wardens with the State Forester.

The tax abatement law of 1903 was so modified as to permit planted trees down to 700 per acre to be eligible for abatement and natural seeding to count in making up the number required.

The classification law of 1923 was changed so as to allow any land owner to classify up to 100 acres in any number of towns; the growth alone determining the value at the time of application.

Provisions for abating part of the state and county taxes to towns containing state as well as federal forest lands.

Several changes in the law authorizing the Governor and

Council to close woodlands in times of fire danger and prohibiting the dropping of lighted cigarettes or other articles likely to cause fires within 200 yards of any woodlands during a closed period.

A joint resolution appropriating $200,000 for the purchase of the Franconia Notch as a forest reservation and park.

REPORT OF LUMBER CUT FOR 1925.

Section 63, Chapter 191 of the Public Laws (Acts of 1925) requires that every owner operating or causing to be operated any timber, excepting cordwood or pulpwood, shall during the month of January of each year render a report to the State Forestry Department, giving in separate items the amount of softwoods and hardwoods cut within the State by or for him during the preceding calendar year.

In accordance with this provision cards were mailed to every party known to have operated timber during 1925. The list of operators was obtained with the assistance of the N. H. Lumbermen's Association and the Selectmen of the various towns. Cards were sent to 550 parties reported as having cut timber during the year. Returns were received from 534 parties, of whom 84 reported no cut in 1925. The total cut of 248,156 M. board feet, not including pulpwood, was obtained from 450 parties, of whom 350, cutting over 50 M. each, reported a total cut of 246,808 M. The total cut of 100 small operators amounted to only 1,348 M. While 219 parties cut over 250 M. and 129 over 500 M. each; the bulk of the cutting in the state was done by fewer than 200 parties.

Table 1 showing the cut by counties gives 170,652 M. feet of pine, 47,128 M. feet of other softwoods and 30,376 M. feet of hardwoods. It may be of interest to note that the total cut for 1925, 248,156 M. is a decrease of 34,000 M. from the estimate of the Forestry Department for the year 1923 as published in the report of 1924.

TABLE 1

LUMBER CUT BY COUNTIES 1925 NOT INCLUDING PULP WOOD

	Pine.	Other Softwoods.	Hardwoods.	Total
Belknap County ...	7,902 M.	1,929 M.	1,383 M.	11,214 M.
Carroll County	14,037	4,809	1,959	20,805
Cheshire County ...	15,613	4,880	4,111	24,604
Coos County	422	781	1,201	2,404
Grafton County	16,245	7,748	5,299	29,292
Hillsboro County ...	29,619	6,365	5,725	41,709
Merrimack County...	22,828	3,730	3,864	30,422
Rockingham County .	22,539	1,391	529	24,459
Strafford County ...	20,809	3,078	965	24,852
Sullivan County	2,563	6,701	1,495	10,759
Cut by out of state operators	18,075	5,716	3,845	27,636
Total by species ..	170,652 M.	47,128 M.	30,376 M.	248,156 M.

CO-OPERATION WITH THE FEDERAL GOVERNMENT.

Clarke-McNary Law.

The Weeks Law passed by Congress in 1911 providing for the purchase of national forest land in the eastern states also contained a section by which the Secretary of Agriculture was enabled to co-operate in forest fire protection with those states which had an organized system of forest protection and appropriated funds for the purpose. The first year federal aid in fire protection amounted to $7200 and under the co-operative agreement was used entirely to pay for forest patrolmen in the wild land sections of the state. The following year 1912 the federal allotment was $8,000 and was used to pay for both patrolmen and lookout watchmen. These men were designated as federal agents under the State Forester acting as a co-operator and were paid direct from Washington. Later federal funds were used exclusively for lookout watchmen and during succeeding years the amount of this aid fell to as low as $5,500 in 1919 because of the fact that little increase in federal appropriation was made by Congress while a constantly increasing number of states developed their fire protective organizations so as to benefit from federal aid.

In 1921 and 1922 a radical change was made in the method of allotting fire protective funds to the states. The cost of maintaining an adequate system of forest fire protection based on the forest land area, the extent of fire hazards and other factors was determined by the federal government for each co-operating state and the federal appropriation was then distributed among the qualifying states on the basis of seven per cent of the adequate cost of protection. This was done in order not only to help improve fire protective measures generally but to contribute according to the actual needs of each state rather than in accor-

dance with what each state might be spending for protection. The results were intended to give greater assistance to those states having relatively large forest areas and where the importance of protection was not yet fully realized. In accordance with this change New Hampshire received an allotment of $8,425 in 1922 which was seven per cent of $120,400, determined as the cost of an adequate system of protection for the state.

Another change made at that time was to pay the federal allotment to each state as reimbursements upon the receipt of vouchers showing that the state had spent its ratio of the total state fire appropriations and federal allotment combined. The federal reimbursements became available for any use connected with forest fire protection, such funds being received by the State Treasurer and kept in a separate, continuous fund by act of the Legislature of 1921. This was a very helpful change for the state in as much as federal money became available for all forest fire purposes. In 1922 and also 1924 the Forestry Department was enabled to meet the town fire fighting costs and avoid a deficit only because of the federal fund in the State Treasury. In other years it helped to build lookout towers and telephone lines besides paying a part of the regular patrol and lookout expense of the state.

The cost of an adequate system of protection for New Hampshire has since been increased from $120,400 to $134,300 to conform to standards used in other states, which is an increase from 2.8 cents to 3.2 cents per acre for 4,300,000 acres of forest land outside of the national forest. The allotments for 1926 and 1927 have increased to $9,940 which is 7.4 per cent of the estimated total cost of adequate protection. These increases of course were made possible because of larger appropriations by Congress. It is hoped that total state and federal funds available for forest fire protection will ultimately approach if they do not reach what is considered to be the cost of an adequate system of protection. At such time federal funds should represent 25

per cent of the total cost and the state, towns and private co-operating agencies in each state should pay for 75 per cent. If such should come to pass New Hampshire would be spending $100,725, all agencies combined, and the federal government would be spending $33,575. The present total expenditures for forest fire protection not including federal funds amount to $62,000. The total appropriation by Congress for co-operation in fire protection is now about $600,000 having increased from $200,000 in 1911.

Another change which is being brought about is to confine the use of federal fire funds to the prevention of forest fires. It has formerly been permissible to pay for fighting fires as well as for prevention work in part out of federal funds. Since suppression costs fluctuate widely from one fire season to another, it has often not been possible to make the best use of federal money each year without either running the risk of not providing adequately for emergency costs for fighting fires or not receiving the full amount of the federal allotment.

The Clarke McNary act of June 7, 1924 carries forward all the work of the Weeks Law of 1911 with several additions. One of these authorizes the Secretary of Agriculture to co-operate with state forestry departments in maintaining forest nurseries for the production and distribution of forest tree seeds and plants for reforestation purposes in connection with farm woodlands. Under this section of the Clarke McNary work, New Hampshire receives the benefit of $2,000 yearly which is placed in the federal fund in the State Treasury for the nursery work, the only stipulation being that this $2,000 must offset at least a similar amount used solely for producing trees for farm forests. One of the most important benefits likely to accrue from this co-operation is aid in securing needed seed supplies for the growing of trees. Already the machinery of the federal government has started to establish seed collecting agencies in different sections of the country so that seed of standard species can be made available for the state foresters who

must depend on collections in their own states or purchases from commercial seed dealers.

Another section of the Clarke McNary law provides for assistance to the owners of farms in establishing, improving and renewing useful timber crops and under this section the Secretary of Agriculture co-operates with the Directors of Extension of the State Agricultural Colleges in paying half of the services of a farm forestry specialist in each state to work with the Farm Bureau organization in the different counties in promoting woodlot forestry. At present $1,500 is furnished by the federal government and must at least be duplicated by the state. It is required that the Directors of Extension shall work with the state forestry departments in determining the lines of forestry education to be advanced by the farm forestry specialist.

In all the various lines of the Clarke McNary work which call for use of both state and federal funds it is the purpose to raise the standard of forestry practice wherever the states have the machinery and funds for co-operating. Federal help takes the form of financial aid but more than this it also furnishes leadership and an opportunity for the exchange and improvement of ideas among the states. In no sense is it officious interference with local state affairs. Federal co-operation lends moral and financial support to forestry measures without entering into any administrative responsibilities. The various lines of co-operation were worked out with state authorities by forest specialists who have no possible interest other than the general public good in their specific lines. There is no political or department control of any agents working under the Clarke McNary Act, the agents of the state in every instance employing all persons paid from federal funds and controlling all the activities carried on within the state. In view of frequent criticism expressed in regard to the federal government entering into activities in individual states and interfering with the rights of the states themselves, it should be made clear that so far as any forestry co-operation is concerned objectionable in-

terference does not exist. The administration of the national forest within New Hampshire has no connection with co-operative work under the Clarke McNary law.

Blister Rust Control.

The federal government co-operates with the state in the control of the white pine blister rust disease and to a larger extent than in all other ways combined. Blister rust co-operation is not a part of the Clarke McNary work but under the Bureau of Plant Industry of the Department of Agriculture with special appropriations from Congress to aid all the white pine states which are exercising control mea sures. Federal aid takes the form of paying salary and expenses of blister rust agents in each white pine county and a state agent in charge, all under the direction of the state forester. County blister rust agents work with the County Farm Bureaus and generally have headquarters with them. The state agent in charge has headquarters with the State Forestry Department. A co-operative agreement is entered into by the Secretary of Agriculture, the Director of Extension and the State Forester. All blister rust agents are appointed by the federal government on recommendations of the State Forester and are paid from Washington. These men are primarily educational agents and hold no administrative authority except under the laws of the state and through the Forestry Department. Their work is to study blister rust conditions and inform land owners of the importance of control measures. Under the Forestry Department they have charge of the eradication work which is supported by joint funds of state, towns and individuals. The cost to the federal government in maintaining the force of educational agents is of course much more than offset by cost of eradication measures supplied by appropriations of the state and towns and contributions of private owners of land.

Forestry Education in General.

The importance of education in forestry has long been recognized. During the early years of the Forestry Commission every effort was made to reach organizations and groups of people in order to carry the message of forestry to them. The Society for Protection of New Hampshire Forests has since its beginning in 1901 been an important factor in forestry education. In 1909 when the Forestry Department was organized the State Forester as far as his other duties would permit was required to carry on courses of lectures and to conduct forestry exhibits at fairs and in other ways to inform the people of the state regarding forestry matters. The agricultural college started teaching forestry in 1911 and some work in forest extension among land owners was undertaken in connection with the federal Smith-Lever Act of 1914. Time has subsequently shown the importance of meeting people out of doors, preferably in their own woodlots, to discuss the problems involved. The first real opportunity to meet land owners on the ground came about with the development of the blister rust control work in 1922, when agents were provided by the federal government for the white pine counties of the state. The work of these agents under the State Forestry Department co-operating with the Extension Service has been of large educational value because they are able to meet land owners individually and in groups on their own woodlots and while primarily discussing blister rust problems, they are also able to give advice on all problems relating to the woodlot.

The Clarke McNary act made it possible in 1925 for the Director of Extension to employ an extension forester whose duty it is to help carry the knowledge of forestry directly to owners of farm woodlands. Mr. E. D. Fletcher, formerly of the U. S. Forest Service, became the first Extension Forester, and together with Prof. K. W. Woodward,

prepared an excellent bulletin on Farm Forestry.* Mr. Fletcher resigned soon after and has been succeeded by Mr. K. E. Barraclough, formerly Blister Rust Agent for Rockingham County. During the two years the extension foresters have been able to work with the boys and girls clubs with the result that no less than 500 individual projects have been undertaken in 1926. These projects, such as thinning, planting, releasing white pine from hardwood brush, have enabled the boys not only to learn the rudiments of forestry but put it into actual practice on their home property. A report on "Farm Forestry" by Mr. Barraclough is included elsewhere in this report.

The trend of forestry education has therefore been to carry forestry to the woods in the form of demonstration and actual practice. Lectures delivered in the woods are much fuller of meaning and understanding than those delivered from the platform. Indoor meetings, important as they are, do not effectually result in forestry practice as do those meetings where the problems are discussed in the open. In co-operation with the Extension Service many outdoor meetings of farmers and woodlot owners have been arranged at which representatives of the Extension Service and the State Forestry Department have been the speakers. There is a fertile field ahead for all kinds of educational work in forestry especially with the young people at home and in school, Y. M. C. A. groups, Boy Scouts, Campfire Girls and those in summer camps. After all it is the next generation which will suffer the consequences of impoverished forests and will benefit from improvements undertaken from now on. Unless it is possible to carry forest education more and more to the younger generation a great deal of future effort will be misdirected.

Research and Investigation.

The collection and study of all available facts relating to forest problems has long been recognized as important in

*"*The Farm Woodlot in New Hampshire.*" *Bulletin 30, Extension Service, Durham, N. H.*

order to replace ignorance or unproved theory by scientific knowledge as to the best methods of solving problems of forest management. Work of this nature calls for trained investigators who have the time to devote to such work without interference by other duties. State forestry departments therefore have in a large measure found it impossible to make consistent progress along investigative lines. The need for knowledge in order to solve many forest problems is well known to foresters and timber owners.

In 1923 the Northeastern Forest Experiment Station was established at Amherst, Mass., funds for which was appropriated by Congress, the object being to determine the fundamental facts and principles on which the effective handling of the forests in the northeastern region must be based. Its function in the field of forestry is similar to that of the agricultural experiment stations in the field of agriculture. The territory covered includes all of New England and New York. Investigations are limited primarily to problems in forest protection, forest production, and forest management.

Part of the function of this federal forest experiment station is to work in the closest possible manner with all agencies that are themselves conducting or interested in forest research and to act as a clearing house for bringing together the results of research work by other agencies. Active cooperation in the conduct of forest investigations is entered into with state forestry departments, schools of forestry, lumber organizations, land owners and others. An advisory council consisting of business and professional men interested in forestry problems within the region and appointed by the Secretary of Agriculture, meet with the Director of the station twice each year for purposes of assistance and advice. The New Hampshire members of the present council are Chairman Brown of the Forestry Commission, State Forester Foster and Director Kendall of the Agricultural Experiment Station and Extension Service.

The present program of work of the experiment station adopted with the advice of the council includes nine major

projects and some twelve minor projects. In view of the large amount of research work already under way relating to the white pine region and the lack of knowledge regarding important matters within the northern spruce and hardwood region, several of the major projects deal with such subjects as the methods of cutting pure and mixed spruce and fir in order to secure satisfactory natural reproduction, the growth in yield of spruce and fir and development of volume and taper tables for these species. Another important major project is the study of slash disposal as related to various species and in connection with the matter of forest fire protection. The control of the white pine weevil and the relation of light and soil moisture to tree growth are being investigated. An analysis of forest fire statistics of the various states within the region is being carried on in order to have as complete a record as possible of the forest fire hazards, risks and damage in all parts of the northeast. Special attention is paid to the relation between the number and size of fires, damage and costs and such facts as cause, location, date, elapsed time, weather conditions, forest types, method of cutting and slash disposal. The forest fire reports of the various states are being carefully studied in order that a uniform method of tabulation can be effected. Efforts are also being made to bring about a standard form of reporting fires in the various states in order to better study the results of fires and to encourage fire insurance investigations in which many of the insurance companies are interested. The prediction of fire conditions is another major project growing out of the importance of fire studies. In this the Weather Bureau, the Experiment Station and its co-operators are carrying on investigations to determine the relationship between fires, precipitation, relative humidity of the air and wind velocity so that in the future it may be possible to predict hazardous conditions sufficiently in advance so that urgent preventive measures may be adopted.

Forest research has until very recently failed to receive the attention it merits. Conclusions hastily arrived at in the

past have since proved to be incorrect. The element of time is required in order to bring together the scientific data necessary to reach correct conclusions. The forest problems of the region are no less important than the agricultural problems and there is every reason to believe that the results of investigations already started will be of immense value to forestry and timber production in the future. The progress of forestry in no small measure depends upon the extent to which research receives moral and financial support.

FARM FORESTRY.

K. E. BARRACLOUGH, *Extension Forester*

With the demands for good lumber constantly increasing and the supply steadily diminishing, farm woodlot owners are beginning to take an active interest in practical forestry applicable to their farm woodlots. With the service of an extension forester in the state since 1924, considerable time and thought have been spent in the interests of farm forestry. Although it is not yet possible to fairly guage the results accomplished in forestry extension work among woodlot owners, there have been certain accomplishments that should prove of permanent and practical benefit.

A project of major importance carried on by the extension forester in co-operation with the state boys' and girls' club leader is the junior forestry work among boys and girls in the state. The junior forestry project was tried out by a few 4-H Club members as an experiment in 1923 and proved so popular that it was accepted as a regular project the year following. In the course of three years the forestry project has become one of the major 4-H projects. The first year in junior forestry work thirty-five boys enrolled in the project which resulted in the improvement of thirteen and three-quarters acres of woodland and the planting of thirteen thousand pine trees. Two years later, in 1926, five hundred boys and girls enrolled in junior forestry work. This interest in woodlot improvement cuttings resulted in the releasing and thinning of approximately one hundred acres of pine growth and the planting of fifty thousand pine trees. Besides the actual field work numerous wood collections were made by boys and girls who were too small to do improvement cuttings or to plant, or who perhaps did not have the necessary woodland on which to work.

In order to encourage junior forestry work the Society for Protection of New Hampshire Forests has offered suit-

able awards each year to forestry champions in the different counties. These awards have created a spirit of competition and have done a great deal to make junior forestry work successful. The contests are arranged in such a manner that every forestry member has an opportunity to win an award regardless of the forestry project on which he may be working. The contest for the junior forestry work during 1926-27 is in two divisions, awards being made to the best forestry club in each county and awards to individual club members.

To the forestry club in each county in the state whose members do the largest average amount and best quality of forestry project work (including wood collection, planting, and improvement cuttings) will be awarded a free trip to the 4-H forestry short course at Camp Carlisle in August, 1927 to two of its members.

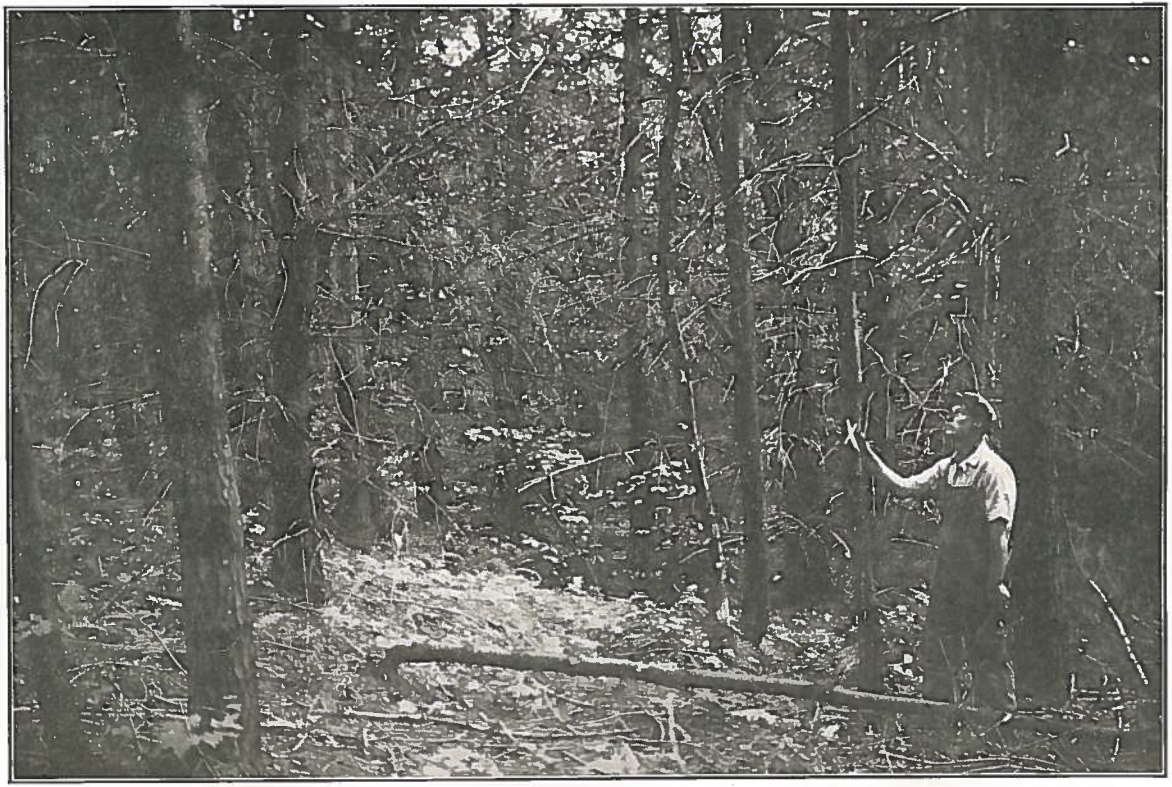
The following points will be considered in determining the winners: (1) total amount of work done, (2) total time spent, (3) quality of work, (4) records and reports submitted by the members. The contest begins on or before November 15, 1926 and ends July 15, 1927.

For the best work done by the forestry club members in Division 4 of the junior forestry project (Farm Woodlot Improvement Cuttings) between October 1 and December 30, will be awarded in each county a bronze loving cup as first prize, and a silver and bronze forestry medal as second and third prizes.

For forestry club members doing planting, a gold, silver, and bronze forestry medal will be awarded as first, second, and third prizes respectively, to the club member in each county making the best plantation, quantity and quality being considered. Work to be done between April 1 and May 30, 1927.

For the club members making wood collections, prizes will be awarded at the county roundups.

All divisions of the junior forestry project count in the 4-H forestry contest. Members of clubs may enter the in-



THINNING AND PRUNING A WHITE PINE STAND. BEFORE.

THE SAME STAND. AFTER.

dividual forestry contests and also count their work with the other members of the club toward the club prize.

The state club leader and extension forester placed junior forestry exhibits at the Eastern States Exposition in 1925 and 1926. The exhibits attracted considerable attention and the practicability of the exhibit in 1925 is demonstrated by the fact that people from three different states after seeing the exhibit at Springfield visited one of the New Hampshire junior forestry champions for that year in order that they might obtain first hand knowledge as to how he improved his woodlot.

The necessity and importance of placing so much stress on junior forestry work is that the principles of forest conservation may be impressed on the minds of the boys and girls to remain with them through life. Furthermore, the boys and girls who practice junior forestry on their home woodlots will themselves reap the harvest. In many cases the parent has deeded over to the boy or girl the tract of land he or she has planted or improved. The boys and girls of New Hampshire will soon handle the affairs of the state and it is highly important that their minds be trained to utilize properly the resources of the state.

Aside from the work with the boys and girls in junior forestry work, the extension forester is frequently called upon by owners of farm woodlots. There are numerous inquiries as to proper methods to apply in handling the farm woodlot and there are difficult market problems that require attention. Through the co-operation of the county agricultural agents and the county blister rust agents, woodlot demonstrations are held each year. At such meetings it is important to demonstrate the proper forestry methods applicable to the farm woodlot so as to obtain the greatest financial return and yet maintain a continuous growth of desirable trees. In addition to the farm visits and demonstrations there are lectures on farm forestry to be given at granges, women's clubs, and other organizations. Lantern slides on junior forestry work which have been made from

pictures of junior forestry work in the state, will soon be ready for use. Such a set of slides will have an element of human interest and will stress the important phases of farm woodlot management.

Another line of endeavor to be of assistance to the farm woodlot owner is the gathering of practical data on farm woodlots in different sections of the state. When farm woodlot owners are located who apply the principles of practical forestry to the woodlot, these farmers are urged to keep a record of their efforts. A simple woodlot record book has been made up for this purpose. The fact that there are in different sections of the state woodlots on which practical forestry is applied, it is possible to use these areas as community object lessons in better forestry practice. Furthermore records that are kept from year to year can be used for urging the practice of farm forestry. Also, the owner himself can, by referring to his records, determine the yearly income from the woodlot. Inasmuch as the aggregate amount of farm timberland in New Hampshire is 1,299,838 acres, and makes up roughly one-third of the total woodland area in the state, with an estimated total stand on this acreage of 6,000,000,000 board feet valued at about $35,000,000 the encouragement of practical forestry on the farm woodlot seems well justified.

It was because of the apparent need of forestry extension work that provision was made in the Clarke McNary Act to make available means to place extension foresters in states where need was felt for such work. Advantage of this opportunity was taken in New Hampshire through a co-operative agreement on the matter drawn up between the University of New Hampshire Extension Service and the State Forestry Department.

FINANCIAL STATEMENT

July 1, 1924 to June 30, 1925.

	Appropriation.	Expenditures.
Salary of Forester	$3,000.00	$3,000.00
Field Assistance	2,200.00	2,199.98
Clerical Expense	4,000.00	3,986.25
Traveling Expense	1,500.00	1,420.56
Incidentals	1,800.00	1,799.34
Printing Blanks	1,200.00	1,197.47
Printing Report	800.00	800.00
District Chiefs	7,500.00	7,498.57
Lookout Stations	9,900.00	9,899.60
Conferences	1,200.00	709.32
Prevention	3,000.00	2,999.92
Nursery	5,500.00	5,497.99
Care and Acquisition of State Lands	5,000.00	3,709.69
Forest Fire Bills to Towns	7,500.00	7,499.84
Reforestation	3,000.00	2,994.40
White Pine Blister Rust	17,000.00	17,000.00
White Pine Blister Rust Special	4,000.00	3,890.01*
Totals	$78,100.00	$76,102.94

* This unexpended balance ($109.99) is an Appropriation Liability available for use during the fiscal year 1925-1926.

July 1, 1925 to June 30, 1926

	Appropriation.	Expenditures.
Salary of Forester	$3,000.00	.....
Transferred from "Prevention"	250.00**	$3,250.00
Field Assistance	2,500.00	2,499.70
Clerical Expense	4,425.00	.....
Transferred from "Prevention"	240.00**	4,665.00
Traveling Expense	1,000.00	954.81
Incidentals	1,800.00	1,610.55
Printing Blanks	1,200.00	1,184.66
District Chiefs	8,000.00	7,596.61
Lookout Stations	10,000.00	9,999.95
Conferences	1,000.00	988.96
Prevention	2,510.00**	2,510.00
Nursery	12,106.00	12,105.54
Care and Acquisition of State Lands	5,000.00	3,423.94
Forest Fire Bills to Towns	7,500.00	5,739.12
Reforestation	4,000.00	3,816.31
White Pine Blister Rust	20,697.00	.....
White Pine Blister Rust	109.99*	18,769.30
Totals	$85,337.99	$79,114.45

* Appropriation Liability carried forward from "Special" 1924-1925 appropriation.

** Transfers to "Salary of Forester" and "Clerical Expense" decreased "Prevention" expenditures $490.

IMPRESSION OF EUROPEAN FORESTRY

By Edgar C. Hirst

At the request of Mr. J. H. Foster, State Forester, I have prepared the following statement of impressions gained on a recent trip which covered many of the important forest regions of Europe.

With fifteen other American delegates I was present at the first World Forestry Congress at Rome from April 29th to May 5th, 1926, which was held under the auspices of the International Institute of Agriculture. The fact that a world conference was thought worthwhile indicates the general conception of the importance of forestry among all civilized countries, and the large attendance and high character of papers accepted for presentation attested the progress which the European nations especially have made in the management of their forests. The reason for holding the World Forestry Congress under the auspices of the International Institute of Agriculture is that at this Institute are represented all of the important countries of the earth and it is the only agency whereby the nations are bound by mutual agreements to furnish and exchange all data they may have on the science and practice of agriculture and allied subjects.

The proceedings and resolutions of the Congress are too voluminous to print here but may be had upon application to the Institute. They cover the field of forestry knowledge and progress. To us the Congress was especially interesting for the opportunity afforded of meeting at one place the leading foresters of Europe. Our travel through the different forest regions was much facilitated.

In describing the forestry operations observed in different countries it will be of especial interest to note the places where forest conditions are nearly like our own. Brief mention therefore will be made of Great Britain, France

and Italy, and more careful descriptions of practices observed in Switzerland, Germany, Finland and Sweden.

Great Britain

The interesting feature is that of policy, for the trees and forest conditions are more like those of our Pacific Northwest than of the Northeast. New England occupies a position in the United States similar to that of Great Britain in the Empire in point of commercial maturity. Many of the industrial problems we are facing are here also. If one can imagine New England after another one hundred years or more of industrial development with her forests used up and depending almost entirely on imported timber the likeness would be still greater.

At one time the British Isles were heavily forested, but the great industrial development of England for the past two hundred years completely overshadowed and took men's attention from the value of home-grown timber. So that forestry at the time of the outbreak of the World War had become little more than a hobby for certain of the landed nobility. Englishmen of commercial and political power were thoroughly convinced of the fallacy of growing timber at home, and the regular program of the country contemplated importing practically all of the timber for industry. Now, as a result of the war experience, the value of home-grown timber is appreciated. The government of Great Britain has inaugurated and is carrying forward a large and carefully worked out program for the planting of non-agricultural lands. Even some of the poorest farm lands are being planted. A study of the situation appears to show that even in that heavily populated country a denser population can be supported on an equal area if farming is concentrated on the best soils and the poorer farm soils used for timber growing, than if the poorer soils also were devoted to farming. The timber grown locally maintains woodworking plants that furnish a living for more people.

The forest planting program of the government has been going on for six years and the original appropriation carries it until 1929. With the enormous tax burden in Great Britain there is some doubt as to whether or not the country can afford to go forward with its reforestation as fast as was at first contemplated, but there is no doubt now that it meets with the approval of people generally, which is a decided reversal of opinion.

France

Nearly two-thirds of the forests of France are privately owned and most of these are in quite small holdings. The remaining one-third is owned by the state, communes and public institutions. Special mention should be made of one of the most successful large scale planting projects in the world, namely, the Landes in southwestern France. Here is a planted forest covering over 1,500,000 acres which once were drifting sand dunes. Besides an extensive business in mine timbers and lumber products this forest now supports a turpentine industry second only to that of the Gulf States of America.

In the Vosges and other mountain ranges softwood predominate. The French Alps furnish quite amazing spectacles of artificial planting of softwood forests to control mountain torrents. Outside of the mountains most of the forests are of broad leaved trees and a very large per cent of them are managed on a system called "coppice under standards." To understand this let us suppose that the hardwood species we are dealing with will grow into satisfactory size for fuel and small products in twenty-five years. At that age they are cut but a number of well formed specimens are left to grow into standards. Every twenty-five years the stand is cut over and the standards may thus be cut in fifty, seventy-five or one hundred years. This system is used to its best advantage in France. The yield per acre is very high but the system produces a great deal of branch wood and hence can be used only where

there is a good market for rather low grade fuel wood. The only place it might be applicable in America would be on some of our hardwood sprout lands near large manufacturing cities.

Italy

On account of the density of population in Italy and the absolute necessity of raising all the food crops which the soil can be made to yield only the poorest sites can be devoted to forests. Also the low standard of living makes possible the cropping of poorer land than could be done in America or the British Isles.

Only 16% of the land is now forested and this includes large areas of chestnut groves where food production is an important consideration. There are very few softwood forests producing construction timber. Over 90% of the growth is of broad leaf trees and most of it is managed on short cutting rotations for small products—posts, vineyard stakes, fuel, etc. Italy must import a great deal of her lumber and heavy timber and an active trade is bringing it from surrounding countries and from the United States.

There are isolated examples of forests managed for large timber which show high yield and quality of product. The most notable one is at Vallombrosa, a former monastery near Florence where the early plantings were made by the monks. The forest is now carried on by the state. It is an open question if some of the land which produces very inferior crop yields would not support more people if forested, but in Italy today capital is lacking to make the initial investments for any large program of planting.

Switzerland

The application of scientific knowledge to the management of woodlands is as old in Switzerland as anywhere. Also we find here the oldest republican government. For an American there is much to learn about the management of forests by a republic. There is a very close relation

between the forests and the life of the people. Everyone feels the importance of good forest management, and it succeeds because its application is entrusted to skilled men.

At present 28% of the forests are privately owned. 5% are owned by the states or cantons, and 67% by communities. Hence the most interesting study is the management of community forests. In early times very little forest land was owned as we understand ownership today. The forest was a hunting ground common to members of a tribe, and the tribal claim to the forest by geographical divisions probably was the inception from which grew the idea of community forests. With the migrations of the peoples and settlement of the country following the Roman occupation definite forest areas were marked out around the village and city settlements chiefly to produce fuel wood for the town dwellers. In most cases the ownership of these forest areas was vested in the original families of the settlements or their heirs. Sometimes the ownership was in fee for the property and sometimes it took the form of equal rights to the return from the forest, which might be received in forest products, or money, or both. These heriditary rights prevail today on most community forests, but contiguous to such tracts there are others acquired by purchase at a much later time. These latter are owned by the political community. From these it is a common practice for each citizen to receive a specified amount of fuelwood, the balance of each year's cut being sold and the revenue taken by the village or city corporation.

Thus the communities were the first to undertake forest protection and improvement. Later their efforts were aided and supervised by the cantons, or states, as the cantons established forest organizations, and simple regulations for the cutting of private forests were made to maintain the timber supply and prevent Alpine avalanches. Later still the forestry work of the cantons and communities were brought together, coordinated and supervised by the federal government or confederation. This was natural and fol-

lowed the development of government generally, for it must be kept in mind that for a long time the cantons were independent nations. It was not until their organization into the Swiss Confederation that federal authority existed. It is especially interesting to see that while the confederation forest authority is now recognized as absolute, its regulatory policy is very simple. The general principle that forest land must be kept productive is promulgated, but the details of how this result shall be accomplished are left very largely to local initiative. Besides the federal forestry board there is a forester for each community forest and a supervising forester for the canton. Then there is a committee of each county council whose duty is to advise and act as a check on the local forester. The forests appear to be well managed with an entire absence of bureaucratic overlordship. The government extends financial aid in developing local forests, especially in the extension of roads to reduce costs of removing mature timber. Considering the mountainous country the Swiss timber is remarkably accessible for sale.

The forests are mostly of softwood species—spruce, fir and pine—and the selection plan of management is generally used. That is, they do not want stands of trees of even age or even size, but rather trees of all ages and heights growing together on the same area. When forestry practice first began the theory of management was to grow even sized trees of clear lumber and when mature cut it clean in small blocks. But the Swiss discarded this practice long ago. They believe that with trees of all ages growing together the air space is more fully used by tree branches and leaves (the wood factory), and it would appear they have shown that a larger volume of wood can be produced on the same ground space. Years of experience have taught them how often the same land may be cut over for the removal of the large timber. On many areas it is done every ten years. Timber to be cut is marked by the forester and generally sold at auction. The

logging may be done either by the forester or the purchaser. But in either case the work is done by contract. Day labor is not used where it can be avoided. To supplement the excellent road system gravity cables often are used to remove logs from the high elevations.

In a word it may be said that the Swiss have applied effectively to the management of woodlands their capacity for republican government and general business foresight and sound practice.

Germany

By the Treaty of Versailles Germany lost a little over 4,000,000 acres of forests. Her present forest area is about 30,000,000 acres. Of this 30% belongs to the states composing the present republic; over 16% belongs to towns and cities, and nearly one-half to private owners. About one-third of the present stand is hardwood and two-thirds softwood. Present cutting and restocking is tending to increase softwoods and decrease hardwoods. The control of forest management is vested to a large extent in the several states. The forest officers of each state not only manage the state forester but either approve or prescribe the plans that shall be carried out by private forest owners. The degree and method of control which the officers exercise over towns and private owners vary in the different states. For instance, Baden is more liberal than Prussia. Also there is much less of the spirit of central autocratic direction than before the war. Still some of this spirit remains. There is more of a tendency to prescribe regulations covering wide areas than was noted in Switzerland. This is more apparent on the state forests.

On the town forests the system of growing coppice with standards, so popular in France, has been used extensively. But the cutting methods on many of these town tracts are now planned with the definite object of converting into high forest to be managed on the selection method. There are many examples of forests yielding good returns from

timber cutting and at the same time furnishing city recreation grounds. Heidelberg and Freiburg are especially worthy of mention. The latter city owns 8,000 acres. The part nearest the city is used as a park and little cutting is done except to improve the growth. There are excellent roads throughout the forest, and the hills sloping down to these roads are covered with oak and beech. Since oak is more valuable than beech they steadily increase the proportion of oak by cutting a great deal of beech during an oak seed year, and not cutting either oak or beech in a beech seed year. On account of the good road system cuttings can be made wherever desired. The usual plan of cutting such a forest is to begin on the hilltops and work down in succeeding years. When the lower slope is cut the new growth on the upper slope is well along. Large clear cuttings are not made because they look badly from the roads and the resulting growth is an even aged stand which is not desired. The goal sought is a mixed forest from which the largest trees may be removed at fairly regular intervals. At Heidelberg besides the example of successful town forest management there are many plantations of European and American coniferous trees in varying mixtures with remarkably complete records of growth. The net revenue from the town forests varies from $1 to $5 per acre per year, which is somewhat less than it was before the war.

Of unusual interest is the Black Forest, a mountainous region forty by two hundred miles, east of the upper Rhine in Baden. Scattered through its valleys are many farms and villages and the hills and mountains are covered with forests, mostly of softwood. There are many owners of this woodland including towns, individuals, corporations, and the State of Baden itself. The region has been famous from time immemorial for its straight long timbers which have been driven down the Rhine and Murg rivers to seaport log markets of Rotterdam and Amsterdam since 1100 A. D. The river drivers of early times, by loaning

money on timber land mortgages, obtained possession of some of the best timber tracts in the Black Forest. This is now a stock company owned 49% by the heirs of these old rivermen and 51% by the state. State ownership of stock in business corporations is rather common in Northern Europe. Our party was fortunate in spending several days in the woods with officers of this company. There is a large amount of very old spruce and fir standing on the forest because the company makes a special business of furnishing long timbers for the Rotterdam log trade. In some places it has gone so far that young growth is suppressed and there are forming even aged groups of old trees. In order to break up this condition and restore more natural conditions heavier cuts are now being made in these older stands. Softwoods reproduce naturally after cutting and very little planting is required. A fine system of roads is maintained, so well arranged that most felled trees can be hand skidded to a road. All main roads and even part of the skid roads are of stone. For some time the company has been spending over $2 per acre annually for road building and maintenance. Logs are cut in the spring and summer, peeled and skidded to roads. This work is all done by contract. This year such work was costing about $6 per M. ft. and the men were making about $3 per day. At the roads logs are sold by auction and were bringing $16 to $30 per M. ft. depending on location, size and quality.

At Tharandt near Dresden in Saxony, canditions are interesting because plans of forest management have changed markedly within recent years. The pulp and paper business became established very early here and used spruce which came down the rivers from the Hartz Mountains. The forests nearby were then planted as fast as cut with spruce, which grew in even aged stands, attained pulpwood size in forty to sixty years, and being near the mills brought a good price. This succeeded admirably for a time. The simplicity of regulation made possible by cutting and plant-

ing in solid blocks lent itself to more exact financial calculations and appealed to the foresters of Europe. It was rapidly converting the profession when some years ago these forests were found not to be doing well. Peat was forming on the soil and growth was slower. This condition has continued steadily. It is now apparent that such even aged stands of softwood are not natural and if repeated generation after generation prevent proper soil renewal. Great efforts are now being made to introduce mixtures that will keep up the soil quality.

Private forests in Germany have been rather strictly regulated by the state. Before the war they were favored by low taxes and large owners were often rewarded by the government with official and social prestige. Thus was the value to the country of a timber grower esteemed. Since the war the taxes are high on private forests as on all property in Germany, but while other forms of investment, such as bonds, became valueless, forests remained intact and their owners are relatively more wealthy now than formerly.

There are many examples of the use of non-agricultural lands, the most extensive being in the Province of Brandenburg, North Prussia. This whole country is a flat or gently rolling sand plain stretching away to the Baltic Sea on the north; 35% of it is too poor for farm crops. On these light sands forests of Scotch pine are grown. The growth is not rapid and the establishment of new growth after cutting is often quite difficult. But the careful management applied shows that the Germans believe it is well worthwhile to keep such lands in timber growth and realize a steady though moderate return rather than to let them lie idle and contribute nothing to employment or industry.

Finland

The present status of forestry practice and the timber industry in Finland is a most interesting result of the qualities of the people applied during the contrasting

changes that have taken place in their recent history. Racially the Finns are Magyars who settled the country fifteen hundred years ago, pushing back the original Laplanders as they advanced northward. They were early brought under the control of Sweden and during four hundred years a Finno-Swedish culture wrought a high degree of public intelligence until the country was conquered by Russia in 1809. For the past one hundred years as a Russian Dukedom Finland has enjoyed more local autonomy than most of Russia's possessions. Soon after the Prussian Revolution in 1917 Finland took her destiny in her own hands and proclaimed herself an independent republic.

Under Russian rule forestry investigation and education and regulations for cutting on Crown land had been going on slowly for fifty years. In recent years general forest knowledge and able forest personnel developed rapidly. Since the establishment of the republic Finland has maintained a forest organization of high professional standing, educated and trained at home. This is important since timber is the largest resource and forest products constitute 85% of the exports.

Nearly 75% of the total area of Finland, or about 60,000,000 acres, is forest. About one-fifth of it is swampy where tree growth is slow. The forestry department of the government has drained some of these swamps, thus adding to the area of faster growing woodlands, and has additional drainage projects under way. Softwoods, Scotch pine and Norway spruce predominate everywhere, and natural regeneration of softwoods after cutting is generally abundant. Except in the far north tree growth is quite rapid on the good soils, due no doubt to the long daylight during the growing season in these latitudes. Up to about fifty years ago there was a practice in vogue of cutting and burning small forest areas and using the ash fertilized land for farm crops until its fertility was exhausted, then allowing it to grow up to trees while another

patch was so treated. This increased the amount of birch, alder and aspen which seeded up these old fields. With the gradual abandonment of this practice and the stabilizing of agriculture on the better lands spruce has been seeding in and taking the place of hardwoods on these old burns, so that today spruce is increasing in proportion to other trees. Forest research of a high order is being carried on. Not so much study has been made of growth, yield, and plantations of different trees as of the biological life of the forests, especially the conditions of ground cover that promote natural regeneration of the best trees after lumbering.

The large forest industries—pulp and paper mills, sawmills, box factories, etc.—are located on the sea coast. Timber is floated to them on the rivers. Extensive improvements on rivers and connecting chains of lakes have created hundreds of miles of drivable waterways making large timber areas accessible to the conversion plants. Along these streams water powers are being developed. The timberlands owned by the large sawmill and pulp companies are managed in a very conservative manner. The fire risk is not high and two large insurance companies carry over 2,000,000 acres of forest at a cost of one-tenth of 1% to the owners. Also there is not the problem of hardwood sprouts interfering with young softwood growth that obtains in northeastern United States, for softwood reproduction is abundant and hardwoods form a small per cent of the forests. Small owners have not been so careful in managing their woods. With them there is more tendency to over cut. Recently the government has required that timber cuttings be done in a manner to insure forest regeneration and has created provincial committees for the purpose. There is also an association subsidized by the state whose duty it is to carry on educational and advisory work among private forest owners. In some of the larger companies the government is an important stockholder.

Taxation of forests in Finland is very low compared with ours. There are three kinds of taxes assessed against

forests—local community tax, state income tax, and state property tax. They are too intricate and involved to discuss in detail here. With the aid of Finnish officials I figured out the amount paid under all three taxes for many different sets of conditions. It appears that an equivalent of from ten to fifteen cents per acre would cover what a large proportion of the forest owners in Finland pay annually as a total under all three taxes.

The various forest interests have cooperative agencies for the promotion of their mutual purposes. This is true not only of timberland owners for practising forestry, but for association in exporting lumber and timbers. Also there are sales associations for paper and pulp, wood board, plywood, lumber, etc. Many of these are associated together in larger organizations and all are more or less closely knit together through government interest and support for the whole economic program of the forest land and the industrial life it supports.

Sweden

For its size Sweden is one of the richest timber countries in the world. It is well called "the land of timber and turbines." More than half its total area is productive forest land and the rivers, which flow from the mountain range which separates it from Norway down to the sea; are said to have a possible per capita power development four times as great as will be possible in the United States. The annual forest growth is far more than is required at home, giving a large exportable balance of forest products.

Most of the productive forest area of 55,000,000 acres is in the central and northern part and occupies all of the hill and mountain country as soon as one gets a little way from the river valleys. In the southernmost part the climate is milder and most of the land is agricultural. Hence the forest is less in proportion. Nearly 90% of the forests are softwoods. The hardwoods, birch in the north

and beech and oak in the south, form not much over 10% of the total amount.

Sweden owns more Crown or state forests than was the case fifty years ago. Large areas formerly belonging to the Crown were sold and exploited, but later there was adopted a policy of buying and adding to the state forests as purchases could be made advantageously. At present over three-fourths of the good forest land is privately owned and less than one-fourth owned by the state and communities.

The forest industries are usually concentrated at the mouths of the rivers where year round operations of saw-mills, pulp and paper mills, etc., are located. In the north these ports are icebound in winter, farther south they are open all the year. The rivers are remarkably well adapted for driving and are highly improved. Up the valleys there are frequent villages and farms which supply the winter woods labor. Practically all woods work is done by contracts.

One cannot view these pulp and lumber centres and the timber lands which supply them without realizing the carefully planned woods management on which the whole thing rests. Sweden has regulated timber cutting for a long time, but the policy is not like Germany's nor yet like Switzerland's. No cutting methods are prescribed but the owner is required to secure a satisfactory regeneration of the forest after cutting. The method used is decided on by the owner and the administration of the law is in the hands of provincial—or what might with us correspond to county —boards. The state forests are managed by the highly trained and skilful officers of the forestry department. The development of their technique has covered many years and is founded on very able research. A great deal of study has been given to soils and ground cover vegetation and forest cutting plans are based on the knowledge of the best way to secure forest regeneration on certain

kinds of soil. Also great care is used in securing seed for restocking land from proper trees and localities.

The fire risk is low and timber insurance may be secured at very reasonable rates. Forest taxation is quite moderate and while not ideal in simplicity the desire to tax on the basis of income or yield is fairly well achieved by several separate assessments. Few owners would pay an equivalent of more than fifteen cents per acre annually.

As the development of home forest industry—including lumber, paper, pulp and matches—has increased the money export value of the forests, and effective management is concentrating on increasing the growth. Sweden may look forward to a continued heavy export of forest products.

Some Conclusions

1. The forests of Northern Europe have fewer species than ours and management problems are easier. There is not nearly so much hardwood growth and softwood regeneration is therefore much less difficult to secure.

2. The constant demand for fuel wood in the thickly populated countries of Europe makes a market for the low grade products of the forest, particularly hardwood. This makes possible improvement cuttings that may not be possible with us until industrial chemistry finds a use for such material.

3. Germany developed the mathematics of forestry before the biology of the forest was learned. The mistake was made of thinking forestry had developed to an exact science with the growing of even aged softwood forests from artificial planting. Other nations have learned from the failures and successes of Germany which has been the great forest laboratory of Europe.

4. Switzerland is the record country to study the management of forests by a republic and to observe the best development of natural mixed forests attaining high yield.

5. In Sweden and Finland are the best examples of

extensive softwood forests managed in large units by water transportation. There conditions are much like northern New England and forest research is constantly discovering facts about soils and ground cover that become basic information in forest management.

6. European forests as a whole are far more accessible than are ours, and forest road building is going on constantly.

7. The best examples of management are on the state and town forests. Nearly all European countries consider it worthwhile to use their poor soils for timber growing and secure a moderate return instead of letting them lie idle. The North Prussian sand plain reminds one of parts of our Lake States except that the former is producing timber steadily and the latter is still largely waste. Such work must be classed as public enterprise. The returns are too low to attract private capital.

8. Private forests are not always successful, but are usually so when other factors are favorable. In Germany before the war they succeeded on account of low taxation, and since the war on account of the survival value of the investment. In Switzerland and elsewhere the woodlands attached to farms are usually quite profitable as they are taxed low and add to the working unit. Large tracts in the Black Forest of Germany and in Sweden and Finland are profitable. These are tributary to good markets or are owned by large consuming industries.

9. Forest taxation is low as compared with ours, except in countries affected by high taxes due to the war. In the countries where forestry is succeeding best and where conditions are nearest like our own—Switzerland, Sweden and Finland—forest taxes are much lower than ours.

WOOD USING INDUSTRIES, STATIONARY SAW MILLS AND RETAIL LUMBER DEALERS

BELKNAP COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Belmont Lumber Company	Belmont	Box Shooks
Boulia-Gorrel Lumber Company	Lakeport	Box Shooks and Retail Lumber
Chase & Veasey	Lakeport	Veneer Boxes and Lumber
Clark, G. H. & Company	Meredith	Box Shooks and House Finish
Cook Lumber Company	Laconia	Box Shooks and Retail Lumber
Corson, H. O.	Center Barnstead	Wholesale and Retail Lumber
Drake, E. B. Estate	Barnstead	Saw Mill and Retail Lumber
Emery, Charles M.	Tilton	Boxes, Shooks, and Retail Lumber
French, S. E. & Sons	Center Barnstead	Wholesale and Retail Lumber
Gordon & Plaistridge	New Hampton	Saw Mill
Howe, C. G.	Sanbornton	Saw Mill
Jaquith, John A.	Tilton	Wholesale and Retail Lumber
Leighton, J. P.	Center Harbor	Saw Mill
Meloon, E. H.	Meredith	Box Shooks
Meredith Casket Company	Meredith	Burial Cases
Prescott, F. R.	Meredith	Box Shooks, Doors, Sash and Blinds Retail Lumber
Seward, T. F.	Center Barnstead	Saw Mill and Retail Lumber

CARROLL COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
American Lumber Products	Ossipee	Dowels
Ames Mfg. Co.	Ossipee	Dowels
Berry, O. P. Co.	Wolfeboro	Excelsior
Bosse, Paul	Conway	Wholesale and Retail Lumber
Clow, S. W.	Wolfeboro	Boxes and Shooks
Carroll County Lumber Company	Center Ossipee	Novelties and Miscellaneous
Conway Wood Heel Company	Conway	Wood Heels

CARROLL COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Chick, J. F. & Son	Silver Lake	Door, Sash and Blinds and Retail Lumber
Chase, J. M.	Effingham	Saw Mill
Drew, Lyle S.	Wakefield	Wood Novelties and Toys
Evans, F. P.	Tamworth	Saw Mill
Gibson, J. L. Company	No. Conway	Retail Lumber
Goodhue & Hawkins	Wolfeboro	Boats
Goulding, L. D. Company	Conway	Spools
Hobbs, F. P.	Wolfeboro	Wholesale and Retail Lumber
Hoyt, Edwin E.	East Madison	Saw Mill and Retail Lumber
Huckins, S. O.	Ossipee	Saw Mill and Retail Lumber
Hutchins, Frank	Wolfeboro	Excelsior
Kearsarge Pegs Company	Bartlett	Pegs
Kelley, Percey	Moultonboro	Saw Mill
Kennett, Frank E.	Conway	Wholesale and Retail Lumber
Livermore Mills	Livermore	Wholesale and Retail Lumber
Lucy, Arthur O.	No. Conway	Saw Mill
Lord, Wm. H.	Union	Excelsior
Libby, W. H.	Intervale	Planing and House Finish
Miles, H. A.	Effingham Falls	Saw Mill and House Finish
Milliken & Merrow	Freedom	Chair Stock
Mudgett, H. H.	Intervale	Saw Mill and Retail Lumber
Mason & Moulton	Ossipee	Wholesale and Retail Lumber
Pitman & Dinsmore	Jackson	Saw Mill
Rust, Horace	Wolfeboro	Wholesale and Retail Lumber
Smart, C. E. & H. P.	Center Ossipee	Saw Mill
Snow, William	Snowville	Novelties and Lumber
Snowmobile Company	West Ossipee	Dimension Lumber
South Tamworth Industries	South Tamworth	Saw Mill, Toys and House Finish
Tappan, W. S.	Sandwich	Saw Mill
Vinall, Geo. W.	Sandwich	Saw Mill
Willey, A. H.	Tuftonboro	Saw Mill
Wolfeboro Planing Mill & Supply Company	Wolfeboro Falls	General Mill Work and House Finish
Yates, W. H.	Bartlett	Saw Mill

CHESHIRE COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Amidon & Martin	Winchester	Wholesale and Retail Lumber
Annett Box Company	East Jaffrey	Boxes and Saw Mill
Beauregard, George	Marlboro	Saw Mill
Beverstock, O. D. Company	Keene	Hoops and Rims
Beaver Mills	Keene	Saw Mill and Cooperage
Bean & Symonds	East Jaffrey	Saw Mill, Box Shooks and Retail Lumber
Burdett Chair Co.	Keene	Chairs and Brush Handles
Colburn, S. J.	Walpole	Saw Mill
Carey Chair Manufacturing Co.	Keene	Porch Chairs
Cleaves, S. H. & Son	West Rindge	Saw Mill, Baskets and Retail Lumber
Damon, Walter S.	Rindge	Brush Handles and Retail Lumber
Damon, Jonas, Est.	Fitzwilliam	Saw Mill and Wood Turning
Demerritt Fischer Company	Nelson and Keene	Porch Chairs
Donovan & Pierce	Ashuelot	Wholesale and Retail Lumber
Farrar Brothers	Troy	Wood Turning
Fish, A. E. & Company	Keene	General House Woodwork
Frost, C. C.	North Walpole	Boxes and Shooks
Green Mfg. Co.	North Walpole	Boxes
Hart, D. J. Box Company	Marlboro	Boxes and Lumber
Hatch, C. E.	Alstead	Saw Mill and Retail Lumber
Hastings, B. A.	East Sullivan	Saw Mill
Hopkins, Frank G.	Keene	Wholesale and Retail Lumber
Impervious Package Company	Keene	Kegs and Tubs
Joslyn, C. M.	Chesterfield	Saw Mill
Keene Screen Company	Keene	Screens
Kingsbury Manufacturing Co.	Keene	Toys
Keene Chair Company	Keene	Chairs
Keene Woodenware Company	Keene	Pails and Saw Mill
Lane, Chester L.	East Swanzey	Pails and Buckets
Lempster Queen Clothespin Mfg. Co.	Marlow	Clothes Pins
Lynnwood Heel Company	Keene	Wood Heels
Lane Chair Company	East Swanzey	Chairs
Lawrence Box Company	Keene	Boxes
Martin, Leason & Son	Richmond	Saw Mill, Woodenware and Lumber
N. E. Box Company	Swanzey, Winchester	Boxes and Saw Mill
Norcross, O. V.	Keene	Wholesale and Retail Lumber

CHESHIRE COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Norwood Calef Co.	Keene	Porch Chairs
Nelson Manufacturing Co.	East Swanzey	Lumber
Newell, C. J.	Alstead	Saw Mill and Retail Lumber
New Hampshire Match Co.	East Jaffrey	Matches
Platt Box Co.	Troy	Boxes and Toys
Pittsburg Plate Glass Co.	Keene	Brush Handles
Russell, C. L. & Sons	Keene	Chairs
Robinson-Bret Co.	Keene	Door, Sash and Blinds and Retail Lumber
Sarvin Wood Heel Co.	Keene	Wood Heels
Scott, Glenroy W.	Keene	Retail Lumber
Spaulding, M. O.	Keene	General Woodworking
Sprague & Carleton	Keene	Porch Chairs
Stone, R. W.	Fitzwilliam	Saw Mill and Retail Lumber
Seaver, E. W.	Chesham	Box Shooks
Stone, S. S. & Son	Fitzwilliam	Saw Mill—Stretchers and Shims
St. Pierre, August	Jaffrey	Retail Lumber
Thayer Portable House Co.	Keene	Portable Houses
Thompson, O. G. & Son	Westmoreland	Woodenware
The Loveren Co.	Marlboro	Reels, Cedar Bird Houses and Lumber
Union Box & Lumber Co.	East Rindge	Boxes
Whitney Bros.	Marlboro	Toys
Watson, L. S. Co.	Marlow	Cattle Cards and Lumber
Winn Bros.	Harrisville	Chairs
Walker, C. W. & Sons	Rindge	Saw Mill—Headings, Lumber
Whitcomb, W. T.	Swanzey	Chairs

COOS COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Baldwin, Frank W.	Pittsburg	Saw Mill and Lumber
Brown Company	Berlin	Paper, Pulp, Lumber, etc.
Buber, Luther Sons Company	Berlin	Retail Lumber
Cone, H. N.	Columbia	Saw Mill
Grover, Scott A.	Errol	Saw Mill
Groveton Paper Co.	Groveton and Northumberland	Paper and Pulp
Hammond, Frank	Colebrook	Mill Work and Lumber Doors, Sash and Blinds

COOS COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Hicks, A. C.	Colebrook	Retail Lumber
Holt, Orrin S. & Son	Dummer	Saw Mill
Hunt, S. G.	Whitefield	Saw Mill
International Paper Co.	Berlin	Paper and Pulp
Kimball, W. H.	Stratford	Lumber, Laths and Dowels
Lemiex, Oliver	Berlin	Saw Mill and Furniture
Libby, E. & Sons Co.	Gorham	Mill Work and Retail Lumber
Lombard Bros.	Colebrook	Retail Lumber
Moore, Herbert A.	Lancaster	Retail Lumber
Paris Manufacturing Co.	Dummer (P. O. So. Paris, Me.)	Saw Mill
Parker, George F.	Lancaster	Retail Lumber
Rolfe, A. J.	Northumberland	Doors, Sash and Blinds
		Retail Lumber
Thompson Manufacturing Co.	Lancaster	Door, Sash and Blinds
		Retail Lumber
Whitefield Manufacturing Co.	Whitefield	
White Mountain Mfg. Co.	Berlin	Lumber and Bobbins

GRAFTON COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Acer Lumber Co.	Haverhill	Hardwood Flooring
Ashland Lumber Co.	Ashland	Saw Mill and Retail Lumber
Blodgett, Fred W.	Wentworth	Saw Mill
Brooks & Whitney	Franconia	Bobbins and Lumber
Burtt, A. F. & Co.	Plymouth	Retail Lumber
Clayburn Bros.	Piermont	Boxes and Shooks
Clough, N. P. & Co.	Lebanon	Saw Mill and Retail Lumber
Calley & Currier Company	Bristol	Crutches
Cushman Manufacturing Co.	Canaan	Saw Mill
Clark, E. M.	Haverhill	Retail Lumber
Cone, N. B.	Rumney	Crutches
Collins, E. R.	Enfield	General Mill Work and Lumber
Conrad, E. J.	Lisbon	Saw Mill
Deane, Benjamin	Ashland	Saw Mill and Lumber

GRAFTON COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Draper Company	Beebe River	Saw Mill and Bobbins
Eaton, H. A. & Sons	Littleton	Bobbins
Eastman, C. A.	Ashland	Saw Mill and Lumber
Ellingwood, O. D.	Littleton	Retail Lumber
Elliott, E. A.	Rumney	Crutch Manufacturer
Farr, A. N. & Co.	Littleton	Saw Mill and General Mill Work and House Finish
Ford, Charles A.	Orange	Saw Mill
Gale, C. M.	Landaff	Wholesale and Retail Lumber, Saw Mill and Bobbins
Gibson, Hamlin & Spaulding	Plymouth	Wholesale and Retail Lumber
Gordon, John	North Woodstock	Saw Mill and Retail Lumber
Hambleton Bobbin Company	Lebanon	Bobbins
Hutchinson & Hutchinson	Bristol	Picker Sticks
Hutchins, H. E.	Groton	Saw Mill
Kenniston, G. L. & Sons	Rumney	Tennis Racquets
Lary, Asa	Canaan	Saw Mill
Lewis, E. H.	North Haverhill	Planing Mill, Lumber and Finish
Lisbon Bobbin Co.	Lisbon	Bobbins
Littleton Lumber Co.	Littleton	Retail Lumber
Maloon, E. H.	Meredith	Box Shooks
Moosilauke Lumber & Bobbin	Piermont	Bobbins and Lumber
Morse, J. B.	Enfield	Saw Mill
Moulton, A. C. & Son	Plymouth	Wholesale and Retail Lumber
Noyes, C. M.	Landaff	Saw Mill and Bobbins
Nutter, Joshua	Bath	Lumber and Laths
Parker Young Co.	Campton	Wet Pulp
Parker Young Co.	Lincoln	Lumber and Paper
Parker Young Co.	Franconia and Easton	Saw Mill
Parker Young Co.	Lisbon	General Woodworking
Pattee, Fred L.	W. Canaan	Saw Mill
Pike, Company The	Pike	Bobbins and Lumber
Pratt, O. M.	Plymouth	Saw Mill and Lumber
Remick, W. S. H.	Groton	Saw Mill
Richardson, Frank	Littleton	Retail Lumber
Rogers, A. H.	Canaan	Saw Mill
Ross, E. J.	Bath	Saw Mill
Rogers & Godfrey	Canaan	Wholesale and Retail Lumber

GRAFTON COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Sanborn, S. O.	Orford	Saw Mill
Sawyer, A. W.	North Woodstock	Saw Mill
Shellow, Charles H.	Bath	Bobbins
Stone, D. S.	Haverhill	Retail Lumber
Tobey, Fred E.	Plymouth	Wholesale and Retail Lumber
Wells & Allard	Bristol	Saw Mill and Retail Lumber
Wells & Flanders	Enfield	Boxes
Whitney, E. P.	Franconia	General Mill Work and Bobbins
Wilfore, T. H.	Rumney Depot	Wholesale and Retail Lumber
U. S. Dowel Company	Ashland	Dowels
Young, Charles A.	Easton	Lumber and Bobbins

HILLSBOROUGH COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Abbott, J. C. Estate	Antrim	Cradles
American Box & Lumber Co.	Nashua	Lumber, Boxes, Shooks, Saw Mill
American Dowel Company	Milford	Dowels and Boxes
American Shoe Form Co.	Manchester	Shoe Forms
Amoskeag Paper Mills	Manchester	Paper
Atwood, F. T.	East Manchester	Box Shooks
Balch, Albro L.	New Ipswich	Saw Mill
Bates, E. R.	Nashua	Wholesale and Retail Lumber
Batchelder Worcester Co.	Manchester	Box Shooks
Bernies, W.	Greenville	Saw Mill
Bickford Lumber Co.	Nashua	Wholesale and Retail Lumber
Blanchard & Son	Greenville	Chairs
Blanchard Chair Mfg. Co.	Greenville	Chairs
Burnham, F. A.	Manchester	Show Cases
Carpenter, H. J.	Manchester	Barrels and Boxes
Cavanaugh Bros. Co.	Manchester	Wholesale and Retail Lumber
Chagnon, E. A.	Nashua	Retail Lumber
Chase, Warren	Milford	Saw Mill and Retail Lumber
Clement Toy Co.	Weare	Toys and Fire Work Foundation
Commonwealth Last Co.	Manchester	Lasts
Converse, Robert	Amherst	Saw Mill
Cook, F. D. Lumber Co.	Nashua	Retail Lumber
Crescent Woodworking Co.	Manchester	Toys and Handles
Crockett, George	Hancock	Cooperage

HILLSBOROUGH COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Curtis, A. L.	Wilton	Saw Mill and Cooperage
Dalton, A. Box Co.	Manchester	Paper and Wooden Boxes
Derryfield Company	Manchester	Doors, Sash and Blinds Retail Lumber
Drewry Bros.	Weare	Toys
Eastern State Package Co.	Peterboro	Baskets
Falconer, W. M.	Milford	Saw Mill
Fellows & Son	Manchester	Saw Mill, Boxes, Shooks and Burial Cases
Felton, S. A. & Sons Co.	Manchester	Brush Handles
Fessenden, B. & A. D.	Brookline	Lumber & Staves
Fessenden, O. D.	Brookline	Cooperage
Fessenden & Lowell	Reed's Ferry	Cooperage and Saw Mill
Flanders Hardware Co.	Weare	Tool Handles
French & Heald Co.	Milford	Furniture
Frye, E. B. & Sons	Wilton	Saw Mill and Woodenware
Goodell Co.	Antrim	Saw Mill
Gregg & Sons	Nashua	Door Sash and Blinds
Hadley, Harry G.	New Boston	Saw Mill, White Pine Finish
Hadley, Frank E.	W. Wilton	Saw Mill, Chair Frames, Toys, General Work
Hall, Lester M.	Nashua	Saw Mill
Hartshorn, Frank Lumber Co.	Milford	Lumber and Box Shooks
Haskell, A. B. Co.	Nashua	Burial Cases
Hayden, S. J.	Brookline	Wholesale and Retail Lumber
Hayden Bros.	Hollis	Saw Mill
Hazeltine & Gordon	Merrimack	Excelsior
Hodge, J. Co.	Manchester	Door, Sash and Blinds and Retail Lumber
Hubbard, Sash, Door & Lumber Co.	Manchester	Doors, Sash and Blinds
Indian Head Casket Co., Inc.	Nashua	Burial Cases
Johnson Lumber Co.	Manchester	Wholesale and Retail Lumber
Johnson, Fred O.	Hancock	Boxes
Jones, David R.	Merrimack	Tables
Kendall & Hadley	Goffstown	Door, Sash and Blinds
Kimball, F. G.	Manchester	Wholesale and Retail Lumber
Langdell Lumber Co.	Manchester	Wholesale and Retail Lumber
Maxwell, W. H.	Manchester	Wholesale and Retail Lumber

HILLSBOROUGH COUNTY—*Continued.*

NAME	ADDRESS	WHAT MANUFACTURE
Maine Manufacturing Co.	Nashua	Refrigerators
McElwain, W. H. Company	Manchester	Wood Heels and Forms
McLane Manufacturing Co.	Milford	Post office Furniture
Melendy, C. F.	Hudson	Saw Mill
Merrimack Wood Heel Co.	Salem	Wood Heels
Milford Novelty Works	Milford	Lawn Furniture and Accessories
Muir Lumber Co.	Manchester	Retail Lumber
Nashua Building Co.	Nashua	Retail Lumber
N. E. Mill & Lumber Co.	Hudson	Retail Lumber
Nettleton & Harris	Goffstown	Door, Sash and Blinds and Retail Lumber
Newton, H. G.	Francestown	Saw Mill Wood Working
Paige, Morton	Antrim	Reels
Parker, Frank A.	Goffstown	Wholesale and Retail Lumber
Parker, Peaslee & Odell	Reed's Ferry	Wholesale and Retail Lumber
Piper, B. H. Co.	Manchester	Wood Turning
Poole, A. D. (Builder & Finis	Nashua	House Finish
Proctor Bros.	Hollis and Nashua	Saw Mill, Barrels, Pails, Tubs, House Finish, etc.
Proctor, D. W.	South Merrimack	Saw Mill
Putnam, J. A. G.	South Lyndeboro	Saw Mill Lumber
Rumrill, E. C.	Hillsboro	Mill Work and Retail Lumber
Sanborn & Atwood Corp.	Manchester	Door, Sash and Blinds and Mill Work
Sanborn Carriage Company	Manchester	Truck Bodies
Sheldon, H. M.	Hancock	Clothes Pins
Smith Box Co.	Manchester	Boxes and Shooks
Stevens, Kemp & Hazen	Peterboro	Retail Lumber
Sutherland, O. A.	New Boston	Boxes and Lumber, Saw Mill
Taylor & Cilley	Manchester	Wholesale and Retail Lumber
Tolles, J. H. & Co.	Nashua	Boxes, Lumber, House Finish
Toy Manufacturing Co.	Weare	Toys
U. S. Bobbin & Shuttle Co.	Manchester and Goffstown	Bobbins
Utility Table Co.	Nashua	Tables
Upton and Whitcomb	Hancock	Wholesale and Retail Lumber
Walden Knife Co.	Bennington	Knife Handles
Walker, A. F. & Son	New Ipswich	Wood Handles
Warren Lumber Co.	Peterboro	Wholesale and Retail Lumber
Weare Manufacturing Co.	Weare	Toys
West Side Lumber Co.	Manchester	Lumber
White Mountain Freezer Co.	Milford and Nashua	Saw Mill, Freezers and Lumber
Whiting, David & Son	Wilton	Saw Mill, Boxes and Lumber
Wilder, F. A.	Hancock	Saw Mill-Custom

MERRIMACK COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Ayers, B. K.	Concord	Wholesale and Retail Lumber
Bailey Lumber Co.	Suncook	Box Shooks and Retail Lumber
Bartlett Excelsior Co.	Warner	Excelsior
Bickford and Huckins	Gossville	Lumber and House Finish
Blodgett, F. E. & Son Co.	Concord	Wholesale and Retail Lumber
Boutwell, Upton & Boutwell	Concord	Saw Mill, Retail Lumber
Chadwick & Kidder	Franklin	Mill Work and Retail Lumber
Colby, J. C.	Boscawen	Wholesale and Retail Lumber
Concord Lumber Co.	Concord	Doors, Sash and Retail Lumber
Clark, A. T.	Pittsfield	Saw Mill
Crown Wood Working Co.	Henniker	Wood Novelties
Danbury Novelty Company, The	Danbury	Wood Novelties
Davis & Rogers	Suncook	Wholesale and Retail Lumber
Dow, Barton & Pettingill	Suncook	Wholesale and Retail Lumber
Dow, Harold W.	Warner	Saw Mill and Retail Lumber
Eastman, H. A.	New London	Saw Mill and Retail Lumber
Ela Box Co.	Warner	Boxes
Emery, M. W.	New London	Saw Mill
Emery, H. L.	Franklin	Boxes and Lumber
Ford Manufacturing Co.	Contoocook	Boxes and Lumber
Heath, C. E. & Co.	Hill	Wholesale and Retail Lumber
Hill Toy Co.	Hill	Toys
Hill Lumber Co.	Henniker	Saw Mill and Retail
Holmes & Choate	Penacook	Wholesale and Retail Lumber
Holt Bros.	Concord	Wheels and Truck Bodies
Hutchinson Bldg. Co.	Concord	General Mill Work and Retail Lumber
International Paper Co.	Franklin	Paper and Pulp
K. & C. Mfg. Co.	Henniker	Bicycle Rims
Loveren, Frank O.	Loudon	Saw Mill
Martin & Sawyer	Warner	Wholesale and Retail Lumber
Moody, A. L.	E. Andover	Box Shooks
Morse, Charles E.	Hooksett	Wholesale and Retail Lumber
N. E. Box Company	Concord	Boxes
N. E. Novelty Works	Hill	Wood Novelties
N. H. Box & Lumber Co.	Pittsfield	Boxes and Lumber

MERRIMACK COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Rolfe, C. M. & A. W.	Penacook	Doors, Sash and Blinds and House Finish
Russell & Foster	Franklin	Retail Lumber
Sanborn, C. G.	Concord	Wholesale and Retail Lumber
Stevens, C. P.	Franklin	Clothes Reels
Stevens Bros.	Bradford	Saw Mill
Stoddard, A. B.	Sutton	Saw Mill
Towle, B. M.	Epsom	Saw Mill
U. S. Hame Co.	Andover	Hames
Whitney, W. F. Co.	Concord	Chairs
Woodward, O. H.	So. Sutton	Saw Mill

ROCKINGHAM COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Barton Wood Heel Co.	Plaistow	Wood Heels
Bartlett, W. S.	Kingston	Saw Mill and White Pine
Batchelder & Janvrin	Hampton Falls	Wholesale and Retail Lumber
Bailey and Mills	W. Hampstead	Wholesale and Retail Lumber
Belanger Bros.	Salem	Mill Work, Door, Sash and Blinc
Benson, G. W. & Co.	Derry	Retail Lumber
Bodwell, W. E. Co.	Salem	Wood Heels, Finish
Borchers, C. H.	Salem	Doors, Sash and General Wood Work
Carpenter, J. N.	Newmarket	Saw Mill, Lumber and Finish
Chase, Benjamin Co.	Derry	Wood Specialties
Cheney, R. W.	Newton	Saw Mill and White Pine Finish
Colard, S. J.	Exeter	Saw Mill
Cole, William M.	Salem	Wholesale and Retail Lumber
Critchet, Arthur	Candia	Saw Mill
Davis, Bert	Derry	Retail Lumber
Dow, Albert N.	Exeter	Wholesale and Retail Lumber
Edwards, C. H.	Chester	Saw Mill
Ellis, J. H.	Fremont	Saw Mill
Exeter Lumber Co.	Exeter	Retail Lumber
Emery, C. M.	Auburn	Wholesale and Retail Lumber
Fellows, G. F.	Kingston and Brentwood	Boxes, Lumber and Wood Heels

ROCKINGHAM COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Fessenden Company, Inc.	Londonderry	Saw Mill and Retail Lumber
Folsom, E. S.	West Epping	Saw Mill
Folsom, Frank	Raymond	Wholesale and Retail Lumber
Griffin, W. H.	Auburn	Saw Mill
Goldsmith, N. H.	Chester	Saw Mill
Hall, C. M.	Atkinson	Saw Mill
Harvey, J. P. & Son	Lee	Saw Mill
Howard, Thomas E.	Derry	Wood and Paper Boxes
Hunt, L. H. & Sons	Canobie Lake	Wood Heels
Janvrin, B. T.	Hampton Falls	Retail Lumber
Janvrin, John A.	Hampton Falls	Retail Lumber
Ladd, L. P.	Epping	Wholesale and Retail Lumber
Littlefield Lumber Co.	Portsmouth	Wood Turning and Retail Lumber
Lord-Champlin Co.	Epping	Box Shooks
Lord & Carlisle	Hampton Falls	Saw Mill
Merrimack Wood Heel Co.	Salem	Wood Heels
Morgan William, Company	Salem	Door and Window Frames
Newton Box Company, Inc.	Newton	Boxes
Nye, E. W.	Sandown	Staves and Lumber
Odell, M. E.	Derry	Mill Work and Retail Lumber
Pingree, A. W.	Auburn	Saw Mill and Retail Lumber
Peaslee Lumber Co.	Plaistow	Saw Mill and Retail Lumber
Randall, Isaac	Hampstead	Wholesale and Retail Lumber
Seavey, George S. Estate	Windham	Saw Mill and Retail Lumber
Spaulding & Frost Co.	Fremont	Saw Mill, Cooperage and Retail Lumber
Standard Wood Heel Co.	Seabrook	Wood Heels
Towle, H. M.	Kensington	Saw Mill
True, R. S.	Chester	Wholesale and Retail Lumber
Varney, George	East Derry	Saw Mill
Wadleigh, E. L. & Son	Exeter	Boxes and Lumber
Webster Wood Heel Co.	Exeter	Wood Heels

STRAFFORD COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Allen Manufacturing Co.	New Durham	Wood Turners and Enameling
Berry, F. J.	R. F. D., Rochester	Wholesale and Retail Lumber
Brock, Martin S.	Rochester	Wholesale and Retail Lumber
Champlin, W. H.	Rochester	Box Shooks and Lumber
Chartland, C. S.	Dover	Wholesale and Retail Lumber
Chase Handle Co.	New Durham	Handles
D'Arcy Company	Dover	Window Sash
Foss, D. & Son	Dover	Saw Mill, Boxes, Doors, Sash and Blinds
Foss and Hersey	Somersworth	Wholesale and Retail Lumber
Fownes Manufacturing Co.	Rochester	Paper and Wood Boxes
Giles & Langley	Farmington	Boxes, Shooks and Lumber
Halliday, Penfield Lumber Co.	Rochester	Retail Lumber
Hatch & Bowden	Dover	Wholesale and Retail Lumber
Mathes, M. Everett	Dover	Wholesale and Retail Lumber
Mooney, G. F. & Son	Farmington	Wood Turners and Retail Lumber
Proctor Bros. Co.	Rochester	Stave Stock and Lumber
Richards, A. W. & Co.	East Rochester	Wooden Ware
Rochester Lumber Co.	Rochester	Retail Lumber
Shaw, C. C.	Rochester	Wholesale and Retail Lumber
Shaw & Royal	New Durham	Wood Turning
Studley Box & Lumber Co.	Rochester	Saw Mill, Boxes and Lumber
United Box & Lumber Co.	Rochester	Box Shooks
Varney, Harry	East Rochester	Wholesale and Retail Lumber
York, E. J.	Dover	Retail Lumber

SULLIVAN COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Alexander, G. E. & Sons	Sunapee	Wood Novelties
Boardway & Cowles	Claremont	Retail Lumber
Bowen, G. G.	Charlestown	General Mill Work and Retail Lumber
Bragg & Buswell	Alstead	Saw Mill
Buss, G. W.	East Acworth	Saw Mill
Chatfield, H. H.	Newport	General Wood Working
Claremont Paper Co.	Claremont	Paper
Claremont Ice & Lumber Co.	Claremont	Saw Mill and Retail
Cook, Bert E.	Cornish Flat	Saw Mill
Cutts, Herbert	Newport	Saw Mill and Retail Lumber
Kendall Grain Store	Charlestown	Retail Lumber
Nelson & Warner	Charlestown	Retail Lumber
Newport Lumber Company	Newport	Saw Mill and Retail Lumber
Osgood, Edwin B.	Claremont	Retail Lumber
Putney, C. E.	Claremont	Mill Work and Finish
Reed, F. W.	Acworth	Saw Mill
Robinson, E. S.	Goshen (P. O. Mill Village)	Saw Mill
Rowell, Frank P.	Sunapee	Saw Mill
Rowell, J. W.	Newport	Retail Lumber
Sargent, John G.	Newport	Wholesale and Retail Lumber
Trow & Sons	Sunapee	Lumber and Finish

PORTABLE SAW MILLS REGISTERED IN 1925 AND 1926.

NAME OF OWNER	P. O. ADDRESS	TYPE
Acer Realty Company	Woodsville, N. H.	Steam
**Amey, Harry B., Trustee	West Stewartstown, N. H.	Steam
**Andrews Brothers	Fairlee, Vt.	Steam
Andrews, Austin D.	Granite, N. H.	Steam
Archibald, Joseph	Contoocook, N. H.	Steam
*Armstrong, M. G.	Windham, N. H.	Steam
Ashland Lumber Co.	Ashland, N. H.	Steam
**Atwood, Ora J.	Westmoreland Depot, N. H.	Steam
Babb, Walter H.	R. F. D. No. 1, Rochester, N. H.	Gasoline
Bailey Lumber Co.	Suncook, N. H.	Steam
*Bailey, A. D.	School St., Winchendon, Mass.	Steam
Bailey, Charles	Hampstead, N. H.	Steam
*Bailey, Fred O.	Hampstead, N. H.	Steam
*Baker, Sydney D.	Freedom Village, N. H.	Gasoline
**Ballard, Chas. H.	Warner, N. H.	Steam
*Banfill, William	Ossipee, N. H.	Steam
**Bassett, Lewis F.	Salisbury, N. H.	Steam
*Batchelder, W. M.	Hampton, N. H.	Steam
Berry, Albert C.	Strafford Center, N. H.	Gasoline
Blake, Millard	New Hampton, N. H.	Steam
Blodgett, F. E. & Son Co.	Concord, N. H.	Steam
Bosse, Paul	Conway, N. H.	Steam
Bowles, Charles M.	Route No. 1, Gilmanton, N. H.	Steam
Boyd, F. T.	Farmington, N. H.	Steam
Boyd, Hugh	Center Ossipee, N. H.	Steam
**Britton, A. H. & M. J. White	Hartland, Vt.	Steam
Brooks, Clarence A.	Winchendon, Mass.	Steam
**Brooks, Frank W.	Freedom, N. H.	Steam
Brown, John A.	East Barrington, N. H.	Steam
*Brown, John A.	East Barrington, N. H.	Gasoline
Brown, Woodbury J.	Salem Depot, N. H.	Steam
Burleigh, E. H. & F. A.	Meredith, N. H.	Steam
*Burnham, A. L.	Goffstown, N. H.	Steam
Call, Everett	Contoocook, N. H.	Gasoline
Carpenter, Jesse N.	Newmarket, N. H.	Steam
Carr, Alvah	Hill, N. H.	Steam
Carter Brothers	Tilton, N. H.	Steam
Carter, J. C.	Orfordville, N. H.	Steam
*Chamberlain, M. G.	Milton Mills, N. H.	Steam
*Chase, A. B.	Plymouth, N. H.	Steam
Chase, F. H.	Contoocook, N. H.	Steam
*Chase, Irving N.	287 Main St., Amesbury, Mass.	Steam
Chase, S. R.	Alton, N. H.	Steam
Christianson, Martin	R. F. D., Concord, N. H.	Gasoline
Clark, Lester	College Road, Manchester, N. H.	Steam
*Clark, Walter E.	Hill, N. H.	Gasoline
*Clayton & Ward	Madison, N. H.	Gasoline

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
*Colbert, James H.	Pequaket, N. H.	Steam
Colby, Joseph G.	Route 16, Penacook, N. H.	Steam
*Colby, Joseph G.	Route 16, Penacook, N. H.	Steam
*Collins, Raymond	Somersworth, N. H.	Gasoline
Concord Lumber Co.	Concord, N. H.	Steam
*Coutu, Octave	Manchester, N. H.	Gasoline
**Crockett, Harvey M.	Spencer, Mass.	Steam
Cross, Frank G.	Northwood Center, N. H.	Steam
*Cutter, V. A.	Ashuelot, N. H.	Steam
Davis, Freeman R.	Auburn, N. H.	Kerosene
**Day, R. C.	Winchester, N. H.	Gasoline
Dean, Harry G.	Franklin, N. H.	Steam
Deering & Hill	Pittsfield, N. H.	Gasoline
Dennison, A. D.	Conway Center, N. H.	Steam
Donovan & Pierce	Ashuelot, N. H.	Steam
Doolin, Ira F.	Peterboro, N. H.	Steam
*Dow, Harold W.	Warner, N. H.	Gasoline
Dow, John A.	Pittsfield, N. H.	Steam
Drake, E. B. Estate	Barnstead, N. H.	Gasoline
*Drew, John	c/o V.P. Hersey, Somersworth, N. H	Gasoline
*Dubia, C. R.	Route No. 1, Contoocook, N. H.	Gasoline
*Dunlap, W. B.	R. F. D., Andover, N. H.	Gasoline
*Duston, F. K.	Westville, N. H.	Steam
Eaton, Martin H.	Union, N. H.	Gasoline
Ellison, Lewis H.	Durham, N. H.	Steam
*Ellison, W. A.	Route No. 5, Dover, N. H.	Steam
*Ellsworth, Elmer S.	Penacook, N. H.	Steam
Emerson, Charles W.	Enfield Center, N. H.	Gasoline
*Farrington, A. W.	1047 So. Main St., Athol, Mass.	Steam
*Faulkner L. E.	75 Silver St., Greenfield, Mass.	Gasoline
*Fernald Brothers	Nottingham, N. H.	Steam
*Field, Fred W.	R. F. D., No. 2, Northfield, Mass.	Gasoline
Flanders, Charles H.	Bristol, N. H.	Gasoline
Flanders, Charles H.	Bristol, N. H.	Steam
Flanders, Fred W.	Hopkinton, N. H.	Steam
Flanders, Fred W.	Hopkinton, N. H.	Steam
Fleming, John A.	Antrim, N. H.	Steam
**Fogg, Frank M.	Hillsboro, N. H.	Steam
*Folsom, Frank	Raymond, N. H.	Steam
*Ford, C. A.	Canaan, N. H.	Steam
Fortin, Peter	455 Pine St., Manchester, N. H.	Steam
*Foss, C. A.	Northwood Center, N. H.	Steam
Foss, C. E.	Dover, N. H.	Gasoline
Fountain, J. F.	West Rumney, N. H.	Steam
*Fox Bros.	Fryeburg, Maine	Steam
Freeman, Clair W.	Rochester, N. H.	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
French, Byron W. & John A.	Route No. 7, Concord, N. H.	Steam
French, L. E. & Son	Center Barnstead, N. H.	Steam
French, Lewis W. Estate	c/o H. M. Varney, E. Rochester, N. H.	Steam
Fuller, H. K.	Walpole, N. H.	Steam
Gardner, Walter C.	Springfield, N. H.	Steam
*Gerrish, Edwin C.	Route 16, Penacook, N. H.	Gasoline
*Gillingham, Geo. E.	Chester, N. H.	Gasoline
*Goodrich, Frank	Berwick, Maine	Steam
Goss, W. C.	Henniker, N. H.	Gasoline
Grau, James A.	Dublin, N. H.	Gasoline
*Graves, Ross M.	Moultonboro, N. H.	Steam
Guilmet, Napoleon	Madison, N. H.	Steam
Hall, Alpha S.	Hancock, N. H.	Steam
**Hammond, Annie R.	Canaan, N. H.	Steam
Hancock, H. W.	Belmont, N. H.	Steam
*Harrington & Beck	Alstead, N. H.	Steam
Harrington & Beck	Alstead, N. H.	Gasoline
Hart, D. J. Box Co., Inc.	Marlboro, N. H.	Steam
Hatch, H. A.	Bellows Falls, Vt.	Steam
Hatch, H. A.	Bellows Falls, Vt.	Steam
*Hillsgrove, Walter J.	Dover, N. H.	Gasoline
**Hirsch, A. G.	557 Mechanic St., Fitchburg, Mass.	Steam
**Hollis, Roy R.	Ashby, Mass.	Steam
Holmes Brothers	Gerrish, N. H.	Steam
Holmes, D. L.	Route No. 16, Penacook, N. H.	Gasoline
Hood, H. A. & B. A.	Route No. 3, Winchester, N. H.	Steam
**Hopkins, Frank C.	Keene, N. H.	Steam
*Houle, E. J. S.	Raymond, N. H.	Gasoline
*Howard, A. H.	15 State St., Boston, Mass.	Steam
*Howard, B. C.	Marlow, N. H.	Steam
*Howard, Frank E.	Lowell St., Rochester, N. H.	Gasoline
Howe Lumber Company	Leominster, Mass.	Steam
Howe, Earl A.	Claremont, N. H.	Gasoline
*Huckins, S. O.	Center Ossipee, N. H.	Steam
Jaquith, John A.	Tilton, N. H.	Steam
*Jaquith, John A.	Tilton, N. H.	Steam
Jemery & Palmer	Alexandria, N. H.	Steam
*Jemery & Palmer	Alexandria, N. H.	Steam
Jones, A. H.	Belmont, N. H.	Steam
*Jones, Gilman	Berwick, Maine	Steam
Joslyn, A. C.	East Westmoreland, N. H.	Steam
Joslyn, M. M. & A. R. & H. E. & A. C.	Bernardston, Mass.	Steam
**Kay, Clarence E. Estate	R. F. D. No. 6, Dover, N. H.	Oil

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
Kelley, Asa B.	Union, N. H.	Steam
Keniston, John	8 Thurlow St., Plymouth, N. H.	Kerosene
Kimball, Elwin J.	Grantham, N. H.	Gasoline
Kimball, Forest G.	55 Carpenter St., Manchester, N. H.	Steam
Knight, David O.	South Acworth, N. H.	Steam
*Knox, Harry D.	Berwick, Me.	Gasoline
*Lacasse, Edmond	Bemis, N. H.	Steam
*Lacasse, Edmond	Bemis, N. H.	Steam
Ladd, Louis P.	Epping, N. H.	Steam
Langdell Lumber Co.	Manchester, N. H.	Steam
*Langdon Lumber & Garage Co.	R. F. D., Alstead, N. H.	Gasoline
LaRoe, Joseph A.	Warner, N. H.	Steam
*Layne, Benton E.	Dover, N. H.	Steam
Leathers, George A.	Ward Hill, Mass.	Gasoline
Lenz, John	Reed's Ferry, N. H.	Gasoline
Leroux, D. W.	Contoocook, N. H.	Steam
Little, Arthur H.	Westville, N. H.	Steam
**Little, Ben P.	Warner, N. H.	Gasoline
Locke, Clarence B.	Star Route, Rochester, N. H.	Gasoline
Lundberg, Frank E.	Salem Depot, N. H.	Steam
*Mardin, Clement	R. F. D. No. 2, Plymouth, N. H.	Gasoline
Mason, William O.	New Boston, N. H.	Gasoline
McAllister, C. O. & C. A.	R. F. D No. 1, Warner, N. H.	Gasoline
McCaffrey, Thos.	1008 Elm St., Manchester, N. H.	Steam
*McDuffee, Horace	Manchester, N. H.	Steam
*McKenzie, Edward J.	Franconia, N. H.	Gasoline
McKinley, Robert E.	R. F. D. No. 2, Auburn, N. H.	Gasoline
*Melendy, C. F.	Wilton, N. H.	Steam
Meredith Grain Co.	Meredith, N. H.	Steam
*Meredith Grain Co.	Meredith, N. H.	Gasoline
Merrill, A. D.	West Thornton, N. H.	Steam
Merrill, C. N. & Son	Bristol, N. H.	Electricity
*Merrill, Geo. W.	New Boston, N. H.	Steam
Mills, Arthur E.	West Hampstead, N. H.	Steam
Mills, Arthur E.	West Hampstead, N. H.	Gasoline
Moore, John A.	39 Park St., Dover, N. H.	Kerosene
Morse, Edgar L.	R. F. D. 2, Box 48, Woodsville, N. H.	Steam
Morse, M. Wallace	Henniker, N. H.	Gasoline
**Morse, Thomas E.	Claremont, N. H.	Steam
*Muldoon Bros.	Pelham, N. H.	Steam
**Nelson, Ernest	Eaton Center, N. H.	Steam
*Parker Young Co.	Lincoln, N. H.	Steam
*Parker Young Co.	Lincoln, N. H.	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
*Parker Young Co.	Lisbon, N. H.	Steam
*Parle Ice & Coal Co.	6 Kirkland St., Dover, N. H.	Steam
Parshley, H. K.	Dover, N. H.	Steam
**Patenaude, Walter C.	Henniker, N. H.	Steam
*Patenaude, Wm. E.	East Weare, N. H.	Steam
*Pattee, Fred L.	West Canaan, N. H.	Steam
*Perley, John A.	Goffstown, N. H.	Steam
Philbrick, Arthur E.	23 Clark Ave., Lakeport, N. H.	Steam
Pitman, John W.	Bristol, N. H.	Steam
Pluff, H. C.	Canaan Center, N. H.	Steam
*Pratt, H. B.	Kezar Falls, Me.	Steam
**Prescott, C. W.	Winchester, N. H.	Steam
Purington, Charles E.	Lock Box 97, Wilton, Me.	Steam
*Putnam, Fred M.	R. F. D. No. 3, Peterboro, N. H.	Steam
*Rand, O. H.	Derry, N. H.	Steam
Randall, Maurice I.	Hampstead, N. H.	Steam
*Randall, Maurice I.	Hampstead, N. H.	Steam
Raney, Don	Peterboro, N. H.	Steam
Ray, Paul J.	Hillsboro, N. H.	Gasoline
*Roberts, Shirley	Goffstown, N. H.	Steam
Rust, Horace	Wolfeboro, N. H.	Steam
St. John, Joseph P.	Conway, N. H.	Steam
*Sargent's, Geo. W., Sons	Merrimack, Mass.	Steam
*Sawyer, Charles W.	Medfield, Mass.	Steam
*Sawyer, Charles W.	Medfield, Mass.	Gasoline
Scott, Dean R.	Winchester, N. H.	Gasoline
Seaver, E. E.	New Hampton, N. H.	Gasoline
*Shaw, Albert H.	Gilmanton Iron Works, N. H.	Steam
Shaw, M. H.	Hinsdale, N. H.	Steam
*Shepardson, C. H.	Bellows Falls, Vt.	Steam
Simms, Clifton	East Wolfeboro, N. H.	Steam
*Skofield, F. T.	New Boston, N. H.	Steam
Smart, C. E. & H. P.	Center Ossipee, N. H.	Steam
*Smith & Kendall	52 Downing St., Concord, N. H.	Gasoline
**Smith Shook & Lumber Co.	Bristol, N. H.	Gasoline
*Smith, Herman M.	Goffstown, N. H.	Steam
*Smith, Horace H.	Farmington, N. H.	Steam
*Smith, Joseph F.	Meredith Center, N. H.	Gasoline
**Smith, Karl B.	Royalston, Mass.	Steam
*Spalding & Yeaton	Plymouth, N. H.	Steam
*Starkey, W. S. & B. L.	Westmoreland, N. H.	Steam
*Stearns, D. P.	Charlestown, N. H.	Gasoline
*Stevens, Alvah M.	Bradford, Vt.	Steam
*Stevens, John H.	Alfred, Maine	Steam
Stone, Charles W.	R. F. D. No. 4, Pittsfield, N. H.	Gasoline
Stone, D. S.	Woodsville, N. H.	Steam
*Stone, D. S.	Woodsville, N. H.	Steam

PORTABLE SAW MILLS REGISTERED—*Concluded*

NAME OF OWNER	P. O. ADDRESS	TYPE
*Stone, D. S.	Woodsville, N. H.	Steam
Taft & Payne	Westmoreland, N. H.	Gasoline
*Thompson, Freeman	Dover, N. H.	Gasoline
Thurston, M. L.	Exeter, N. H.	Steam
Tobey, Fred C.	Plymouth, N. H.	Steam
*Tobey, Fred C.	Plymouth, N. H.	Steam
Tufts, Edward P.	Route No. 1, Hooksett, N. H.	Gasoline
*Twombly, William M.	Conway Center, N. H.	Steam
Vadney, I. H.	Francestown, N. H.	Steam
*Waldron, Homer J.	14 Pine St., Rochester, N. H.	Steam
Walker Brothers	North Charlestown, N. H.	Steam
Walker, John	Newmarket, N. H.	Gasoline
*Weare, E. W.	Meredith Center, N. H.	Steam
*Weeks, Raymond A.	East Wakefield, N. H.	Steam
**Weeks, Raymond A.	East Wakefield, N. H.	Gasoline
**Welch, Sidney	Freedom, N. H.	Steam
Wellington, Russell H.	Westmoreland, N. H.	Gasoline
**Wentworth, A. S. & Son	Denmark, Me.	Steam
*Wentworth, C. E.	Union, N. H.	Gasoline
*Wheeler, Frank A.	Barnstead, N. H.	Steam
*Wheeler, Scott D. Lessee	229 Front St., Manchester, N. H.	Steam
Whipple, Elmer E.	Winchester, N. H.	Gasoline
Whitcher, H. P.	Strafford, N. H.	Gasoline
Whitney, F. Ralph	Winchester, N. H.	Steam
Whittier, H. F.	Hillsboro, N. H.	Steam
**Wiggin, Ralph M.	Bedford, N. H.	Steam
**Wilkins, C. S.	Keene, N. H.	Steam
Willey, George F.	Canaan, N. H.	Steam
Willey, W. H.	Wolfeboro Falls, N. H.	Steam
Wilson, Alpha T.	Peterboro, N. H.	Steam
*Wilson, Alpha T.	Peterboro, N. H.	Gasoline
Wilson, Harry L.	R. F. D. No. 3, Winchester, N. H.	Steam
*Winkley, M. H.	Ossipee, N. H.	Steam
Wood, Perry	20 Lodge St., Manchester, N. H.	Steam
*Wood, Perry	20 Lodge St., Manchester, N. H.	Steam
Yeaton, William	R. F. D., Tilton, N. H.	Steam
*Yeaton, Roscoe	West Campton, N. H.	Steam
*York, E. J.	Dover, N. H.	Steam
Young, Lendel A.	Lowell St., Rochester, N. H.	Gasoline
*Young, Lendel A.	Lowell St., Rochester, N. H.	Gasoline

*Registered only in 1926.
**Registered only in 1925.