State of New Hampshire

BIENNIAL REPORT

OF THE

Forestry Commission

FOR THE

Two Fiscal Years

Ending June 30, 1928

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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, 1928.

Present Conditions and Taxation. It is apparent that changes are taking place in economic conditions relating to the production and utilization of timber. Decrease in the demand for native pine boxboards and the steadily increasing use of lumber products from the Pacific Northwest and elsewhere reported in detail two and four years ago, are having their effect in depreciating local forest values and declining forest industries.

It is estimated there has been a shrinkage of perhaps $10,000,000 in forest values in New Hampshire during the last five to eight years. Operating costs have increased sufficiently to offset the higher prices received for boxboards and stumpage values of low grade pine are actually lower than before the war. The tax burden serious as it has apparently been in the past is increased with present lowering values. The lumber cut of New Hampshire has dropped from nearly 248 million in 1925 to 212 million in 1926 and 202 million in 1927. There has been a decrease in the total number of operators from 450 in 1925 to 259 in 1927, of whom 200 in 1925 and 160 in 1927 cut the bulk of the timber. Many small operators have discontinued business and others are cutting no more than they can readily sell on the market. The number of portable mills in use from year to year, however, remains about the same. There were 248 portable mills registered in 1928 of which 162 were steam and 86 were gasoline, the latter showing rapid increase proportionately. The small amount of spruce pulpwood in the state makes this of little relative impor-

tance. Pulp is being imported to some extent from Sweden and the lack of spruce supply locally is removing the paper business more and more into Canada. Only the hardwood industry appears to be holding its own or improving.

Recent tax surveys in a number of typical towns reveal a surprising lack of any amount of high grade sawable lumber. Yet most of these towns contain growing pine in abundance which should not be cut for many years but which the owners are more anxious to sell than ever before. The present tendency is to unload as rapidly as possible this low grade pine upon a declining market instead of holding it for increased growth, higher grades and inevitably better prices. Our state as a whole has a wealth of growing timberland but it is poorly stocked and the timber of low grade and requires time and attention to bring to proper maturity. Because of this fact the necessity for relief from high annual taxes on growth was never before so apparent. For many years the Forestry Commission has realized the unfairness as well as the seriousness of the general property tax applied annually to timber growth which promises no immediate returns. It is gratifying now to find public response and earnest efforts on the part of tax authorities to find a remedy.

The present trouble with our forests and forest industries cannot all be laid to unfair methods of taxation. Our forests during the past few decades have been seriously and unwisely overcut. Scores of people have been butchering timberlots and leaving trails of brush and fire in years gone by who never should have been in the operating business. The forest capital has become so far depleted over most of New Hampshire and New England that many of the market requirements cannot be supplied by home grown timber and users have been forced to look to the far west for the better grades. Substitutes for wooden boxes have reduced the market for the low grade.

The classification law passed in 1923 and amended in 1925 is an effort to encourage owners of promising young

growth or reforested land up to 100 acres in any one town by relieving them of the future annual taxes on the growth. Altogether 198 lots in 69 towns with a total of 8431 acres have been classified and probably as much more has been denied classification either because the value of the growth was above the $25 limit or because the land was not sufficiently stocked with trees to promise a future yield of 25,000 feet per acre. The demand for tax relief comes mostly from owners of larger growth than the present classification law can benefit. Relief must come about by either greatly extending the present classification limitations and reimbursing towns for their losses in tax revenue resulting therefrom or else by some other method of substantial benefit to owners of growing timber. Changes, in the direction of a yield tax on stumpage value when timber is cut, should of course make possible the collection of a tax at a higher rate than the present local rates in order to be fair to other classes of property.

The present Legislature needs to give serious consideration to the forest tax problem which is so outstanding today that New Hampshire is rather widely known among people in other states as an unprofitable state in which to own forest property. It is time something was done to show that New Hampshire can be a leader in forest tax legislation because of the larger and more important place which forests hold in our state. The work of the State Tax Commission and the Recess Tax Commission appointed by the last Legislature is most commendable. Great credit is due the Recess Committee for its painstaking efforts during the past two years to solve not only the forest tax problem but other problems relating to taxation as a whole.

During the past year the Forestry Department has made a tax study in six different towns typical of different parts of New Hampshire in order to determine how much loss the towns would suffer and what the effect on other property would be if timber and young growth were exempted from all taxes. It was found that on the average the value

of growth below 9 inches for pine and 7 inches for spruce represented a little over four percent of the assessed value of the six towns examined; while merchantable timber and young growth together averaged about 28 per cent of the total assessed value. It was also found that assessed values range from as low as 62 per cent up to 144 per cent of actual values with the average about 90 per cent. A more detailed report of this study is made a part of this report.

Forest Fire Protection. A report of the work of the Forestry Department must of necessity be largely a report on the administration of the forest laws of the state. The past two years in forest fire protection, particularly the season of 1928, have been generally favorable on account of well distributed rainfall. The best fire record in any recent year has been the present season of 1928 during which the area burned over was 5000 acres less than the average of the last 15 years. In spite of this fact 248 fires not including railroad fires burned 4733 acres. The fires have come chiefly in the early spring during late years, in fact 70 per cent of all fires for four years past have occurred during the months of April and May. This is the time when farmers and others are burning brush and cleaning up and the general public is seeking its spring recreation in the woods. These months are coming more and more to be recognized as hazardous and a time for people to be on their guard. All persons should realize the dangerous possibilities resulting from the rapid spread of fire when grass is dry. Even many farm buildings have been lost during recent spring periods. Conditions are made doubly serious by the fact that of late so much grass land is not being cut for hay and the accumulation becomes an inflammable mass during the spring following. It may become necessary to take extraordinary measures to bring about supervised fall burning of protective strips at points of unusual danger.

The Forestry Department is strengthening its fire service by increasing the number of fire lookout stations each

year and inaugurating such additional patrol during the spring fire period as funds permit. The fire lookouts on Osceola and Kearsarge in Conway, formerly maintained by the state, have been turned over to the National Forest for administration. Relieved of these two stations the Department has been enabled to build new lookouts in other sections where they have long been needed. The new steel tower and cabin on Red Hill in Center Harbor were a gift to the state by E. B. Dane. A wooden tower on Stinson was replaced by a steel tower and the Magalloway tower was rebuilt with wooden timbers. Two new stations with steel towers and cabins were established on Rock Rimmon in Kingston and Oak Hill in Loudon. The state is cooperating with the National Forest officers in the construction of a new station on Mount Hale in the town of Bethlehem. New cabins have also been built on Croydon with the help of the Blue Mountain Park Association, on Kearsarge in Warner and on Monadnock, the last being partly of stone hidden under the summit to replace a small wooden hut which has for many years marred the sky line of this famous mountain. Plans for this cabin were donated by Fay and Thorndike, architects of Boston. Funds for the construction and improvement of fire lookouts and cabins have been made possible under the Federal Clarke-McNary Act without increasing the cost of fire protection to the state. At the close of 1928 the state was maintaining 24 lookouts and the government four within the National Forest. Several other stations will in time be turned over to the government and with the maintenance funds released, the state should restore certain stations abandoned years ago or build new ones so as to shorten the extreme distance for the watchmen to detect fires to not more than 10 miles in the southern counties. About six more stations are needed to make this effective.

The desirability of using preventive measures becomes more apparent every year. It is not only saving the loss from fires but the cost of extinguishing them when meas-

ures can be taken to prevent their starting. On this principle the department maintains a patrolman on a motorcycle to work with the wardens in southern New Hampshire and check up on brush burning during the spring months. Such work should be extended as it is undoubtedly of great importance during danger periods. In emergency such patrol is frequently used for a day or two at a time through joint town and state funds.

For years a better assortment of fire fighting tools scattered over the state has been needed. This past season a beginning was made toward placing some 18 tool boxes along highways adjacent to state forest reservations and the policy continued of supplying small equipment to towns at half the cost, as far as funds were available. Quite a few towns have acquired tool box supplies and even raised money by public subscription to purchase and equip these boxes. R. L. Morgan, President of the Izaak Walton League in New Hampshire, has inaugurated a campaign for the raising of funds to acquire and equip forest fire motor trucks with portable pumps and other tools for the use of groups of towns in different parts of New Hampshire.

The publication quarterly of the news bulletin entitled NEW HAMPSHIRE FORESTS helps greatly to keep the forest fire service conversant with ideas and suggestions regarding fire work as well as to help cement the various agents of the department and cooperators into a more closely knit organization. There is need to bring more of our fire wardens and deputies together in the series of annual conferences. This can be done by paying the time as well as the expenses of attendance. At the present time the state has been able to pay only the expenses of the wardens and deputies, resulting in about 50 per cent attendance on the average. In view of the benefit the towns receive, it is felt they can afford to share the cost as they do other forest fire expenses and by paying both time and expenses, secure almost complete attendance.

Blister Rust. The work of controlling the white pine blister rust disease has continued without interruption for 10 years and during this time three-fourths of the white pine areas of New Hampshire have been cleared of currant and gooseberry bushes. If there is any question as to the interest the majority of towns show in this work one has only to consider that 75 towns voted over $26,000 at the last March town meetings in addition to appropriations of $2,600 by four cities and payments by 37 private owners for eradication work on their own lands. This work for 1928 is not far below the average during many years past in spite of the emergency expenditures of the towns made necessary on account of the flood. While the department is making steady progress toward the completion the first time over of control work there are still some 34 towns which have never paid for any control work and 35 which have appropriated but one year. Many of these towns are among the most important white pine towns in the state and where the disease is prevalent. On the whole 187 towns and cities have carried on control work from 1 to 10 years and over 60 of them have been completely covered once.

The chief blister rust objective now is to complete the first time over work in towns where there is general lack of interest or impoverished finances which are permitting conditions to continue which in the long run will result in serious loss of white pine where it is now one of the chief local resources. It is doubtful if any large proportion of these towns will voluntarily pay for the work and further mandatory legislation may be necessary. Towns which have once been covered and primary control established are now appropriating to have areas re-examined and bushes removed where they are found to have returned. It will always be necessary for a town to make occasional re-examinations which in the years ahead should be part of the necessary expenses of the town, aided to a lesser degree than at present by the state. The present amount of state

appropriation for blister rust control should not be necessary after the next few years but a small appropriation to maintain a skeleton organization for working with the towns must inevitably be part of the Department's work indefinitely. Maps are now being prepared to show areas of each town covered by years as well as areas which should be covered as distinguished from areas where pine is of so little commercial importance as not to warrant the expense of eradication of currant and gooseberry bushes.

Reforestation. Forest planting from the State Nursery resulted during the last two seasons in the setting of about 2,570,000 trees by towns and private individuals, and about 548,000 planted by the department on state forest land. A peak has apparently been reached in the demand for trees. Until such time as land owners have developed a new stimulus, perhaps brought about by an improved system of taxation and an upward trend in pine values, the output of trees from the state nursery will probably not exceed two million trees yearly. Trees to the amount of 267,000 were given to the towns this year on account of a surplus in stock which had to be removed from the nursery. The response on the part of the towns was so marked that it is believed desirable to provide free of charge each year such trees as the towns can use on their own forest areas. The work of the 4-H agricultural clubs in forest planting has come to be of considerable importance due to the activities of the Extension Service of the University.

State Forests and Reservations. The Forestry Commission stands squarely for continued purchase and improvement of state forests and reservations, including roadside areas for the beautification of our highways and the enjoyment of those who use the highways. Except for the Franconia Notch acquisition the last Legislature failed to provide either for the purchase of state forests or for planting on state land. The Governor and Council, however, made $3,000 available in order to keep up the program of planting state land and to use the nursery stock set aside

for this purpose and approved a $5,000 transfer of blister rust balances for the purchase of 2180 acres of land adjoining several of the state forests. A gift was also received of two 100 acre lots of land next the Monadnock Reservation from Mrs. Alice Poole of Jaffrey. The total area of state forests and reservations at the present time is 29,168 acres.

The Franconia Notch acquisition has been the outstanding event in State Forestry progress during the past two years. Through agreement with the Society which raised half of the purchase price of $400,000 the state acquired by condemnation effective August 1, 1928 the upper five-sixths or about 5,000 acres of the Franconia Notch property including the "Old Man of the Mountain" and the lakes and will within twenty years receive title to the balance of the property including the Flume.

The Franconia Notch Reservation is largely surrounded by the White Mountain National Forest, parts of which in Lincoln either touch or closely approach the state highway. National Forest officials are willing to consider an exchange of government land near the highway for an equivalent value in outlying state land. The Forestry Commission believes that the Governor and Council should be given authority by the Legislature to make this exchange of land with the government.

We are forced to realize the park necessities in Franconia Notch as well as Crawford Notch and to a lesser degree certain other of the state reservations. These areas need to be developed as recreation centers where people may freely camp, travel over safe trails and enjoy the beauties to the largest extent possible and receive accommodations suitable to the conditions. The Forest Improvement Fund provided by the last Legislature and permitting the department to set aside income from sales of products and from rentals has already been of assistance in making needed improvement work possible. Taking over the Franconia Notch immediately necessitated wrecking

certain worthless buildings which disfigured the landscape, building toilets, replacing wooden bridges, cleaning up trails and roadsides, establishing camping places, policing the highway and in other ways making a beginning on plans for the permanent development and improvement of the Notch which the public has a right to demand now that the property belongs to the state. The dedication on September 15th also involved considerable expense. To meet these needs involving nearly $10,000 this year the Society for Protection of N. H. Forests paid for about half and the balance was obtained from a lease of the Echo Lake and Profile Stores and from the Forest Improvement Fund above mentioned. Chairman W. R. Brown of the Forestry Commission personally paid the landscape architect for his assistance and plans furnished. In time other income will be available from the Stores and from the Society after 1930 when it begins the management of the Flume concessions. In the meantime 1929 and 1930 will be years in which much work should be done on state land in the upper part of the Notch and little money will be available with which to do it.

Crawford Notch likewise is in need of development. This past season for the first time the income derived from rentals in this Notch has gone back into the property in the form of improvements and the same will take place next year but the amount is not sufficient to make any substantial showing and the possibilities are very great. For each of the next two years the Legislature should appropriate $10,000 for improvements in Franconia Notch and a like sum for Crawford Notch. The Commission believes this to be exceedingly urgent and that delay until funds from income are available would reflect unfavorably not only on the Forestry Commission which is responsible for the management of these properties but much more upon the State itself.

Federal Co-operation. According to Chapter 191, Public Laws, by which the present organization of the Forestry

Department was established in 1909, it is the duty of the State Forester, under supervision of the Forestry Commission, to execute all matters pertaining to forestry, within the jurisdiction of the state—and enter into co-operation with departments of the Federal Government for the promotion of forestry work within the state.

Since 1911 under the Weeks Law and afterwards the Clarke-McNary Law, the Forestry Department has entered into cooperation with the Forest Service of the U. S. Department of Agriculture in forest fire protection and since 1924 with the Forest Service in the production and distribution of trees for reforestation purposes in connection with farm woodlands, the federal funds received for 1927-28 being $12,573.42 and $1,757.78 respectively. It has also cooperated since 1917 with the Bureau of Plant Industry of the U. S. Department of Agriculture in the control of the white pine blister rust disease, toward which the government pays for the agents at a cost of about $30,000 yearly. For educational purposes in connection with farm woodlands the Extension Service of the U. S. Department of Agriculture in 1925 first entered into cooperation with the Extension Service of the State University, the State Forester being a party to the agreement to the extent of approving the various projects undertaken by the State Extension Service.

In addition to these various forms of cooperation requiring the use of joint state and federal funds according to written agreements, there are other minor cooperative efforts such as with the Northeastern Forest Experiment Station in predicting fire weather conditions and compilation of fire records and reports; with the Supervisor of the White Mountain National Forest in certain fire control measures; with adjoining State Forestry Departments for operation of joint lookout fire stations; with the State Department of Agriculture in nursery inspection; and with the State Fish and Game Department and Timberland Owners Association in fire protection. Reference is made to a

detailed description of co-operation with the Federal Government in the report of the Forestry Commission for 1925-26. In the future much more than in the past, on account of the joint acquisition of the Franconia Notch property and agreements relating thereto, the Forestry Commission will co-operate with the Society for Protection of New Hampshire Forests.

In carrying out the several cooperative programs with the U. S. Department of Agriculture involving federal funds used with or offsetting state funds, all of which are to promote forestry in one way or another within the state, the purpose is of course to obtain the best results possible with the funds available. This can be brought about only by strict economy in securing the widest measure of service from each agent employed and avoiding any unnecessary duplication of effort. It is the belief that the forestry law of the state, first quoted above, can be carried out in conjunction with the cooperative efforts of the Federal Government (all under the U. S. Department of Agriculture) in a way to secure wider and more useful service from individuals employed and less duplication than exists at the present time. To do so a system of county or district foresters covering the state, similar to the rangers on a National Forest, should be employed. These district foresters should either be graduates of reputable forest schools or have had training and experience of an equivalent nature. In their respective districts or counties, their primary work should be (1) to take charge of all forest fire protection activities, working with the wardens and other town officers and inspecting fire lookouts, now under five district fire chiefs of the Forestry Department and paid from state and federal cooperative funds, and (2) to handle blister rust control, in cooperation with towns and private owners, now administered by seven federal agents under Forestry Department supervision but paid from the Federal Bureau of Plant Industry funds. These two lines of work would largely require their time from early spring to fall. Dur-

ing the winter months and to a lesser degree throughout the year, they should undertake certain improvement and planting work on state forest lands, assist towns and land owners interested in reforestation, forest improvement and marketing, conduct forest demonstrations, attend meetings and give addresses on forestry, prepare articles for the local press, make exhibits for the fairs, examinations for tax classification, assist and promote the forest industries, keeping records of their changes and outputs, and do other work authorized by law which the Commission and State Forester are required or may desire to undertake for the protection, improvement and extension of forests. Each agent would be the local representative of the State and Federal Government in all forestry matters and would be busy and happy at his task, and well received and appreciated in his district.

There would be many advantages in such an organization. Town officers and land owners could conduct all their forestry business through one agent instead of two or several, saving time and travelling expenses of agents, time of the town or land owner and certainly impressing the public with the desire for efficiency and lack of duplication. The agents would be much more interested in their work and less likely to become dissatisfied if they were representing all forestry activities. There would be less need to send representatives of the Department office in Concord to different parts of the state on minor matters. It is the belief that forestry would receive more wide spread interest and attention at no greater cost than with agents working in divided fields, travelling over the same localities and often meeting the same people on different subjects.

The district forester plan is not without its difficulties, chief of which is the question of dividing his time and expenses and making separate charges against each kind of work, according to whether the funds to pay for it come from one Federal or State source or another. Co-operating under agreements with different bureaus of the U. S. De-

partment of Agriculture whose funds are entirely separate and whose methods of co-operating are different seems to be the real obstacle. If this can be removed, there is no other difficulty which cannot be more easily overcome.

Conclusions. The Commission has submitted its itemized budget for each of the next two years. This calls for the usual and needed operating expenses of the Forestry Department, the restoration of cuts amounting to $11,800 made near the close of the last Legislature and the addition of $20,000 each year for urgent improvements for the immediate benefit of the general public in the Franconia and Crawford Notches.

Other legislative considerations may be listed as follows:

A joint resolution authorizing the Governor and Council to exchange certain areas in the Franconia Notch Reservation in the town of Lincoln for areas of comparable value owned by the United States.

An act specifically authorizing the Forestry Commission to make contracts for the leasing of privileges and concessions on the state forests and reservations for periods not exceeding five years. At the present time it is not clear that such authority exists except for the Franconia Notch reservation.

Amendment to Section 67 of Chapter 191 in order to permit forest fire wardens and deputies to be reimbursed for their time as well as expenses in attending conferences called by the State Forester, in the same manner as for fighting or preventing forest fires (Section 23, Chapter 191).

Amendment to Chapter 194 to require persons or firms to pass an examination by the State Forester and Commissioner of Agriculture for registered arborist and pay a fee before advertising, soliciting or contracting any kind of tree repair work within the State, their certificates to be revocable for sufficient cause.

The advisability of amending the blister rust law, Chapter 195, particularly with reference to requiring towns to make appropriations for eradication of currant and gooseberry bushes.

The advisability of amending Chapter 192 in order to permit free distribution of trees from the State Nursery to towns for town forest planting and to 4-H clubs and other similar organizations within the state.

W. R. BROWN,
B. K. AYERS,
JOHN M. CORLISS,
Forestry Commission.

JOHN H. FOSTER, *State Forester.*

OPERATING EXPENSES AND STUMPAGE VALUES OF WHITE PINE IN SOUTHERN NEW HAMPSHIRE

The Department has recently made a study of conditions applying to the lumber industry in southern New Hampshire, largely confined to white pine operations, market values, costs of operating, stumpage values and method and expense of transportation and comparing prices with those of 1914.

It has been found that the average value of white pine boxboards per M is about 48% higher than in 1914, and that the average cost of operating from stump to stick has advanced about 56%. Manual labor and team hire have advanced more than 50% and the freight rates on an average haul of not more than 75 miles have more than doubled during the intervening period. With regard to stumpage values a bulletin by John H. Foster published in 1914 by the State University says:

"The stumpage value of white pine in New Hampshire can be said to vary from about $4.50 to $12.00 per thousand, according to whether the lot is located sixteen miles or one mile from the consumer or the shipping point. The average second growth pine lot within four miles of the shipping point should have a stumpage value ranging between $7 and $9 per thousand. The average stumpage value of white pine, as determined from a large number of operations, is $7.33. This indicates that the majority of stumpage cut today is within five, or at the most, within six miles of the shipping point."

This quotation clearly indicates that the pine lots were of better quality at that time than now and that the distance between the lots operated and the loading or delivering point was much less than at present.

The following are the market prices, as of December, 1928, of seasoned white pine lumber delivered at market and the different grades commonly quoted:

White pine log run (box lumber)	$25 to $27 per M.
Square edge pine in rough	$32 to $40 per M.
No. 3 barn boards random widths	$38 to $40 per M.
No. 2 barn boards random widths	$42 to $46 per M.
Sash and blind stock in rough	$42 to $60 per M.

The present cost of operating white pine in southern New Hampshire including carrying charges, overhead and profit may be based on the following table:

	Minimum	Maximum	Average
Cost from stump to stick	$9.00 per M	$12.00 per M.	$10.50 per M
Carrying charges, taxes, discounts, insurance, etc.	2.00	2.00	2.00
Freight charges, 10 miles	2.10 75 miles	3.75	2.93
Drawing and loading on cars ...	1.50	2.75	2.12
Overhead and profit	3.00	3.00	3.00
	$17.60	$23.50	$20.55

The carrying charges are about the same under all conditions, and as data is not available to obtain a minimum and maximum profit, the same amount is shown in both columns and may be considered as an average.

The present average price of box boards delivered at the mill is $26.00 per M. By deducting the total average cost of operating and profit of $20.55 it would indicate a stumpage value of $5.45 per M for the average lot cutting none of the better grades than box boards.

If a lot will cut 10% of better grades than box, namely, sash and blind stock, No. 3 barn and better, and some good square edge, the market value of the better grades would average about $15.00 per M higher than box boards, which would increase the average sale value of the entire lot of lumber to $27.50 per M and indicate a stumpage value of $6.95 or about $7.00 per M on this type of a lot.

The same proportion carried out on a lot containing 20% better grades would produce a stumpage value of about $8.50 per M and if 30% better grades were found the stumpage value would be increased to about $10.00 per M.

By taking the minimum and maximum expense of operation and profit it will be found that the stumpage value of box board lots would vary from $2.50 to $8.40 per M feet;

with some of the better grades it would be higher in proportion. These values are all obtained by considering that operations include portable mill sawing, drawing, loading on cars and freight charges. When lot owners are able to team or truck their timber directly to the manufacturing plant, the stumpage values may be materially increased.

Log Trucking in New Hampshire

The method of transporting logs to the large stationary plants sawing lumber has been materially changed during the last few years. Not long since most of the logs were either drawn by team or shipped from some nearby point by rail.

With the rapid development of the trucking industry most of this work is now being done by truck. In fact a recent investigation covering most of the larger plants in southern New Hampshire showed that about 90% of their logs are now delivered by truck.

Log trucking is common up to a distance of 25 miles and indications point to a further increase in this distance as it is apparent that this is the most economical method of transportation. To determine just how far logs may be profitably delivered by trucks would require further investigation.

It is still a fact that teams may be profitably used for short hauls of say one to two miles. Beyond this distance the logs are usually loaded on cars and shipped by freight or drawn direct to the plants by truck.

As a matter of comparison of expense it is estimated that the average cost of drawing and loading on cars is from $2.50 to $4.00 per M. The freight rates applying on logs to be manufactured and shipped by rail are:

Up to 10 miles about	$2.40 per M.
From 10 to 25 miles about	4.00 per M.
From 25 to 40 miles about	4.50 per M.
From 40 to 50 miles about	4.75 per M.
From 50 to 85 miles about	5.25 per M.

The freight charge plus cost of delivering on board cars, and cost of unloading and piling in yard would indicate the total expense of delivering logs to the point of consumption by this method.

The following compiled from information furnished by many of the larger operators in southern New Hampshire shows approximately the cost of trucking logs to mills:

Up to 3 miles from $2.00 to $2.50 per M.
From 3 to 10 miles from $3.00 to $5.00 per M.
From 10 to 15 miles from $5.00 to $7.00 per M.
From 15 to 25 miles from $7.00 to $10.00 per M.

These figures were obtained by taking the actual cost of trucking and the distance covered on fifty different operations, totaling more than 30,000 M feet, and finding the average for the various distances shown.

The variation in costs are made necessary by the general condition of highways, whether state or country road, grades encountered, quality and condition of logs and number of trips per day. These facts should be of interest to the small lot owner and even the larger ones who do not wish to do clean cutting. They suggest the opportunity of thinning or cutting small mature stands, having the logs skidded out to some point where they may be drawn to a nearby saw mill.

There are about 150 stationary saw mill or wood using plants sawing lumber within the state. This method of disposing of timber when the owner can superintend the cutting, or better still do most of the work by using his own men, teams and trucks, should be given careful consideration from now on.

FOREST TAXATION

What the Problem Is. Under the laws of New Hampshire as well as most other states, forest lands and timber growing thereon are considered as real estate to be appraised at their market value and taxed at the uniform rate imposed on other property. The owner of timberland is obliged to pay annually a tax on standing timber for all preceding years of its growth as well as for the last year with no hope of a cash return until timber is cut, whereas the owner of farm lands growing yearly crops, or of improved real estate yielding rents, has an annual return and is not taxed for the product of preceding years and because of the time of year at which the taxes are levied and collected, pays no tax even on the crop for the current year. The degree to which the forest owner suffers on account of his taxes depends upon many things but first of all upon the valuation placed upon the timber and the rate of taxation for the town. If the value is its full and true sale value, as the New Hampshire law requires, and the rate is high the owner is in a poor way to profit from his forest investment and he will generally cut his timber just as soon as a market is possible, without regard to the condition of the market or the growth.

There is a fundamental difference between levying an annual tax on property producing an annual income and levying an annual tax on property producing an income only at the end of a long period of years or at long intervals. One may compare two similar acres of land, for example, one with fruit trees, blueberry bushes, Christmas trees or pasturage or devoted to any other business capable of yielding say $10 every year for 60 years. The other lot is devoted solely to timber production and one crop of timber worth $600 is harvested at the end of 60 years. Both lots are assessed annually under the present system at close to their sale values. The lot with timber produces at the end of 60 years a lump sum of $600. The lot producing a

revenue of $10 each year for 60 years at 5 per cent compound interest gives a net of $3536 as compared with $600 on the timber lot. No sane person could maintain that both lots of equal soil value should be taxed the same amount. The one in timber produces but 17 per cent of the one offering an annual return of $10 and under the present law probably pays the larger tax which carried to the end of the rotation at compound interest largely robs the owner of his $600 return.

A tax paid annually on growing forests which yield no income for 30 or 40 years is equivalent to taxing farm land that number of times in one year. The general property tax is intolerable in its application to forests because it burdens the forest out of proportion to other property and beyond the capacity of the forest to pay. In addition to risks from fire, insects and disease during the long period of years while the timber is growing, there is the certainty of a steadily increasing tax. Not only does the assessed value increase but the tax rate itself increases and as timber lots are cut off, the cumulative burden falls more and more heavily on the remaining stands. The decline in forest capital and the forest industries dependent on a timber supply are helping to impoverish many of our back towns. Before 1890 woodlands were not valued for taxation aside from the general value of the farms of which they usually formed a part. Since then many changes have taken place in tax as well as market values of forest property. Lumber prices advanced to high levels during and following the war and have since receded. Assessed values advanced rapidly from about 1/4 to 1/3 the market values in 1908 to upwards of 72 per cent of market values in 1914. We have no definite means of knowing what the ratio is today but that it is between 75 per cent and 90 per cent is generally admitted; in view of the lumber depression at the present time the tendency is for the ratio to be higher than otherwise. It is estimated that timber values have dropped off at least $10,000,000 in the last few years in New Hampshire.

There is still great irregularity in valuation as among towns as well as properties in the same town. There is little attempt to separate woodland values from that of other property on the tax books or to separately list young growth from merchantable. Values are still low in many towns but in some towns and on many individual lots assessed values are close to if not exceeding their real market values.

There never has been a time when land owners were more desirous of selling their timber than now. That the market is poor only makes the owner the more anxious to sell. One is forced to the conclusion that the majority of lots prematurely cut have been forced on the market because the owners are unwilling to pay taxes on high or increasing valuations, especially if made abruptly, when it can be avoided by removing the timber. The owner more often is unable to pay the increased tax without borrowing the money or depriving himself of some necessity either to his business or personal welfare. Because the lots have been marketable and can be turned into cash it is not only the easiest way to obtain ready money but large taxes are avoided thereby. With the present slump in the boxboard market due to the use of substitutes and other reasons, there is greater need than formerly to grow pine for a longer period in order to produce grades better than boxboard grade which still have a ready sale at much higher prices. Pine lots under 50 years old are capable of producing little lumber better than boxboard grade. While it is financially unprofitable to grow pine beyond 40 to 45 years chiefly on account of taxes it is well known by foresters that the greatest volume production comes between the ages of 55 and 75 years in pine stands. The need for tax relief in stands over 40 years old is greater than in the younger stands. By lessening the tax burden or separating the growing timber from the land and taxing the yield when cut, it would be financially profitable to permit timber to grow to the age of 75 years or more and thereby produce grades which the market demands.

Who is the loser when a timberlot is sold and the lumber removed? The owner may be the loser if the cutting is done before the lot is financially mature and the taxes have not been excessive or the lot perhaps not taxed at all during the greater part of its life or if the lot is particularly thrifty. The town always is the loser because the assessed value must be reduced almost to a bare land value after the cutting. From the point of view of the town the reason for increasing the valuation on growing timber is to obtain increased revenue to the town for the time remaining before the timber is cut. If the lot is cut soon after, the town has distinctly failed in its effort and has lost the increased revenue which it sought to gain. From the point of view of the owner the justification for paying a tax of over 50 per cent of the actual sale value depends upon the character and growing conditions of his timber. He may suffer a decided loss even when the assessed value is less than 50 per cent of the value if growing conditions are poor. On the other hand he may profit by holding the timber for some years when the assessed value is as high as 75 per cent of the actual value if the timber is in good growing condition. The owner is losing every year beyond 40 or 45 years when his assessed value exceeds 75 per cent of the actual value.

History of Efforts to Remedy Forest Tax Situation.

The forest tax problem has long been considered one of serious importance in New Hampshire. In the report of the Forestry Commission 1905-06, pages 204 to 208, Louis Margolin of the Forest Service outlined a system of taxation conforming to certain well known principles and recommended that a small annual tax be levied on the value of the land and the gross income from forest property be taxed at the time when the income becomes available, that is when the forest is cut. To avoid wide fluctuations in the amount of revenue derived by towns it was recommended that the tax should be collected by the state and apportioned among the smaller political subdivisions. It is interesting to note

in view of present discussions that the idea of apportionment applied to the forest tax problem was introduced at this time.

In 1908 the Forestry Commission in co-operation with the Forest Service made a fairly comprehensive study of the forest tax situation throughout New Hampshire, the report of which was published in the Commission's report for 1907-08, pages 49 to 112. A suggested statute embodying the principle of a tax on the cut of timber was included in the report. The basis for this plan was an optional classification and any person could make application for classification if his land contained natural or planted growth, three fourths of which was not over 10 years of age, and have the woodlands pay a yield tax of 15 per cent when cut. The purpose was to start a system which would ultimately bring forest lands into classification and under the yield tax provision.

The Constitutional Convention met in 1912 and passed an amendment which would have enabled the legislature to separately classify forest property for taxation but the amendment was defeated by a narrow margin at the next succeeding election.

In 1914 further studies of forest taxation were made by the Forestry Commission and a comparison of the valuations at that time with valuations in 1908 was undertaken. No recommendations were made to the legislature as it was considered necessary to amend the Constitution in order to bring any relief to owners of forest property.

The Constitutional Convention of 1920 proposed the following amendment to Article 5 of the Constitution: "That the General Court may provide for such special tax valuation of growing wood and timber upon such conditions and restrictions as will tend to prevent the premature cutting thereof, to assure a continuous supply of forest products and to protect the sources of our streams; and may also provide for taxation of the value of such growing wood and timber when cut at a special rate in excess of rates on other

classes of property; and for these purposes may define growing wood and timber and classify the same". This proposed amendment however failed to pass the Convention.

In 1923 the legislature enacted a law to provide for the taxation of growing timber on woodlots not exceeding fifty acres. This was amended in 1925 permitting classification of woodlots up to 100 acres. An amendment of the old abatement law was made, so as to include areas partially stocked with trees provided additional trees were planted sufficient to make 700 trees per acre.

In the meantime the New Hampshire Civic Association appointed a committee on forest taxation, the report of which committee was published in the biennial report of the Forestry Commission for 1923-24. The committee outlined three main lines along which relief might be secured. One was an annual tax on bare land and a yield tax (products tax) of perhaps 10 per cent of the stumpage value when the timber was cut, perhaps on a graduated scale according to the age of the growth. A second was a percentage valuation by which the forest property would be taxed annually at the current local rate but with a valuation adjusted for the crop character of growing timber. The third method proposed was the full value flat rate method which would tax the land and growing timber at full sale value as under the existing system but at a lower rate than the current local rate in order to offset the factors of deferred returns and carrying charges, it being pointed out that such a method had precedent in the flat rate of ¾ of one per cent tax on savings deposits in New Hampshire. The conclusions again were that no relief could be obtained except by constitutional amendment and that out of the various proposals made by tax authorities some method could be devised which would permit the growing of timber without hardship or injustice to the owner once this was accomplished.

The legislative committees of 1927 gave considerable thought to the subject of forest taxation. One or more bills were presented, the belief being somewhat prevalent that

the legislature might pass a measure permitting growth below certain diameter limits to be entirely exempt from taxation. One obstacle in the way of intelligent discussion was lack of information as to what amount of valuation in young growth existed in the state and to what extent relief given to growing timber would affect the general finances of the towns and state. The result was that a Recess Tax Commission was provided to work with the State Tax Commission and other state and private organizations, hold hearings during the two years and report to the legislature of 1929 on the whole subject of taxation. It became obvious that forest taxation was so intricately tied up with taxation in general and the finances of the state that no solution could be arrived at except through an investigation of the whole field of taxation.

During the winter and spring of 1928 the Forestry Department on its own initiative undertook to investigate the forest tax situation in a number of widely separated and more or less typical towns in New Hampshire. The object was to help determine how much loss these towns would suffer and how much burden would be placed on other property in these towns if so called young growth were exempted. During the past two years the Tax Commission and the State Forester have worked together and have rendered every assistance possible to the Recess Legislative Committee. Funds were made available by the Governor to permit the Tax Commission to co-operate with the U. S. Forest Service in a detailed study of three towns in New Hampshire in which the entire field of taxation in these towns was examined and every taxable property classified and valued. It is expected that a report by L. S. Murphy, Forest Examiner of the Federal Tax Inquiry will be received for the benefit of the Interim Tax Committee and the incoming legislature.

Investigation by the Forestry Department. Six rural towns were selected for this study, one in Hillsborough, one in Merrimack, two in Grafton, one in Carroll and one in

Coos County. The results are not altogether satisfactory as the importance of determining the proportion of the assessed value which the assessors would attribute to timber and growth, as compared to other real estate and total values, was not properly conceived or carried out. It is well known that town records give little clue to the valuation of forest property except where timber lots are owned separately from other property, or were acquired at a later date. A special drive was made to appraise merchantable timber and young growth separately in each town. This was very carefully determined in most of the six towns by actually visiting each tract with the owner wherever possible. The primary purpose as before stated was to help answer the question which persistently came up in the last legislature when it was considering a bill to exempt young growth from all taxes. This question was how much value does the young growth have? In the study young growth was considered as up to 9 inches for pine and 7 inches for spruce and fir. In general the effort was to separate lots which could be marketed from those which were still unmerchantable.

The following table gives various determinations for the six towns as a result of the investigation.

Acreage and Value of Woodlands in Six New Hampshire Towns, by Classes and Principal Species

TOWN	MERCHANTABLE TIMBER AND LAND								YOUNG GROWTH AND LAND								INFERIOR		TOTAL		VALUE YOUNG GROWTH ONLY	VALUE MERCH. TIMBER ONLY	RATIO YOUNG GROWTH VALUE TO TOTAL VALUATION	RATIO TIMBER YOUNG GROWTH VALUE TO TOTAL VALUATION
	PINE		SPRUCE		HARDWOODS		TOTAL		PINE		SPRUCE		HARDWOODS		TOTAL		GROWTH ON LAND		WOODLANDS					
	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE	AREA	VALUE				
A	596	[illegible],332					596	[illegible],332	4,560	110,887			1,291	15,701	5,851	126,588	9,046	26,886	15,545	330,816	98,628	[illegible]	7	19
B	831	90,316			500	5,005	1,331	101,215	1,917	39,898			511	3,603	2,428	43,501	6,840	8,460	5,399	153,436	26,085	75,965	6	22
C	3,604	425,830	913	20,835	462	13,810	4,881	485,375	2,387	53,260	534	6,735	9,980	42,579	12,871	102,577	9,455	43,450	27,208	631,399	58,743	377,116	1	10
D	302	19,600	1,254	67,386	13,279	166,560	17,845	273,585	383	3,025	1,393	5,295	2,165	12,885	3,941	20,705	12,290	27,023	33,796	321,313	9,116	232,618	1	31
E	35	1,100	13,798	316,850	9,570	160,646	23,350	478,996	28	215	22,345	108,025	15,601	78,844	34,194	185,584	22,170	37,533	79,864	890,113	110,182	510,978	5	27
F	300	6,950	11,184	393,058	622		12,106	402,008	175	700	10,265	44,873	808	32	11,248	45,605	1,324	1,549	24,713	449,162	43,187	399,483	9	38
	5,610	722,961	28,038	1,039,828	24,173	345,821	59,879	2,108,611	9,920	209,993	34,407	162,928	26,306	154,644	70,633	526,567	56,077	137,601	186,329	2,792,229	345,951	1,706,210	4.3 AVERAGE	27.8 AVERAGE

Additional averages and totals are given as follows:

Average Merchantable Timberland Value per acre (6 towns)	$35.21
Average Young Growth and Land Value per acre	7.50
Average Inferior Growth Land Value per acre	2.80
Average Woodland Value per acre	14.98
Average Tax Rate for the 6 towns, 1927	2.7 per cent.
Total Assessed Value of Improved and Unimproved Land and Buildings	$7,675,629.00
Total Assessed Value of 6 towns	$9,769,131.00
Total Land Area of 6 towns	220,504 Acres
Ratio of Total Woodland Area to Total Land Area	84½ per cent

The average appraised value of timber and young growth exclusive of land is 27.8 per cent of the total assessed value.

Improved and unimproved land and buildings amount to about 78 per cent of the total valuation of the towns, all assessed values given being for the year 1927.

The assessed value of real estate including improved land and buildings connected with woodlands is about 90 per cent of the appraised value of the same property for 5 of the 6 towns. Variation in assessed valuation appears to range from 144.8 per cent down to 62.7 per cent of the appraised value which shows considerable inequality in this respect. Leaving out one town which seemed to be over valued but may not have been so on account of high real estate values existing there and not appraised in the forest investigation, the ratio of assessed to appraised value of real estate connected with woodlands in 4 towns is 76 per cent. It is impossible with any assurance of accuracy to compare valuations in six towns with those of the entire state. It is the belief however that assessed values of woodland are somewhere between 75 and 90 per cent of their full and true values for the state as a whole.

The 1927 valuation of real estate including woodlands outside incorporated limits is roughly estimated at $242,000,000, in which case the assessed value of timber and growth might be as high as $67,000,000. The resource report published in 1923-24 gave a little over $95,000,000 as the value of all woodlands in New Hampshire. It is generally conceded that timber values have dropped 10 per cent during the last five years on account of the lumber market. Making suitable deductions for depreciation and bare land values, and then taking 75 per cent of the balance as the proportion of assessed to appraised value as an average throughout the state, the result gives around $50,000,000 as another figure for the present assessed value of timber and growth in the state. It will be of interest to compare these two estimates with the results of the inventories received from the towns by the Tax Commission.

Various Proposed Methods of Relief. Various proposals for relieving timberlands of the severe burdens imposed under the general property tax may be listed as follows:

Partial Exemptions of Growth.

Below certain fixed diameter limits as for example 9 inches for pine and 7 inches for spruce and fir, broadly meaning to distinguish between merchantable and unmerchantable timber and exempting the latter.

A percentage of volume either in board feet or cords per acre, as for example an exemption of all growing timber up to 10,000 board feet per acre or 5 cords of spruce and fir per acre.

Tax on the Annual Increment or Growth Per Acre.

Tax on the Capitalized Increment Per Acre

Yield or products tax on all timber and growth when cut, with an annual tax on the value of the land not including growth.

Under this heading and to meet conditions in New Hampshire a yield tax would probably have to be placed on areas where the owners contract to pay such tax for the privilege of having the timber and growth exempted from annual taxation. Such a system would in substance be a classification ultimately superseding the present classification law.

Extension of present classification law.

Exemption Below Fixed Diameter Limits. This proposal was offered during the last legislature and resulted in a bill which did not pass to exempt all pine below 9 inches and all spruce and fir below 7 inches in diameter. The results of such a measure would not greatly disturb tax conditions except in some of the northern towns. In the six towns studied by the Forestry Department it would apparently take some $345,951 of valuation out of taxation. This would only slightly increase the tax rate on the balance of property in these towns.

No great benefit can be foreseen as a result. A premium would certainly be put on cutting as soon as the diameter limit for each species was reached. Young growth is not severely taxed at the present time and such a provision while offering some relief to owners of young growing timber does not help to delay the cutting of timber now or soon of marketable size. Timber of larger size needs tax relief even more. It would be difficult for the assessors to make a fair appraisal of the growth beyond the diameter limits fixed and to check the results of their appraisals.

Exemption of a Certain Initial Volume in Board Feet or Cords. This proposal has some commendable features. For example, all pine below 10,000 feet per acre and all spruce below 5 cords per acre might be exempt from taxation. There would be less tendency to cut as soon as growth became marketable. Every owner could maintain a growing stock of the amount exempted and remove his timber without considering diameter limits. In placing the exemption on a volume basis instead of fixed diameters of trees selection cutting would be more likely to come about together with thinnings and other forest improvements leading to stable forest management. It would not change the present system of appraisals made by assessors who are familiar with volume measurements in general and would know about as well how much volume would be taxable under the plan as would be taxable at the present time. Frequent examination would be necessary when lots ap-

proached the exemption limit and lax appraisals would result in much timber being cut without any tax. There would be a reduction in taxes on growing timber which would make them compare more favorably with taxes on other property. General revenue conditions would not be greatly impaired and losses could easily be made up to the towns by means of an equalization fund in the state. There would be more loss of revenue however than from an exemption on fixed diameter limits.

A Tax on Annual Increment or Growth. Under such a plan it would be necessary to determine the annual growth per acre for different types and ages of forests. A tabulation might be devised which would take care of such varying conditions as species, density of stocking, age, quality, lumbering conditions and distance from market so that the assessors could fix the average increment value per acre for any given stand for a period of years. Unfortunately the assessors would not understand the system nor have confidence in it. There might be unfair discriminations on low yielding or poorly stocked stands, common throughout New Hampshire, unless complicated tables were carefully prepared and intelligently applied. This method is somewhat used in Europe particularly in Switzerland. Unless carefully placed, the increment value would be largely guesswork of assessors. It would be a very poor revenue producing measure.

Tax on Capitalized Increment. This would mean a tax on the value or capital which at a given per cent would produce the increment value in one year. In other words it would be a tax on the capacity of the land to produce but not a tax on the increment or growth itself. It would be obtained by dividing the increment value by, for example, 5 per cent and thereby establishing a capitalized land value from which to assess taxes at the usual rates.

A tax on capitalized increment would be in the same nature as a tax on the assessed value of a fruit orchard, increased according to the age and quality of the trees. As a

matter of fact, this is the value based on earning capacity, which forest lands often carried when assessors were left to their own discretion and before the actual value of timber produced was added. It has the fundamental objection of keeping assessed values high. The assessor and land owner would not understand them and errors in assessment would bring about injustice often as great as we have today. Correctly placed, it would be the same as the yield tax, except distributed through the years as an annual tax.

Tax on Yield when Timber is Cut. If applied gradually, as would be the case with a contract system where owners agreed to classify their land and pay a tax on the cut in place of the annual tax on timber values, it is believed that much benefit would result to the owner not intending to cut for some years. The yield tax should be about 10 per cent of the actual stumpage value at the time of cutting, in addition to an annual bare land tax. There is no way of determining the loss of revenue to the towns but this loss would have to be made up by an equalization fund in the hands of the state. Applied to merchantable timber and young growth, it would give any owner relief if he felt his taxes to be sufficiently oppressive to warrant accepting the yield tax provisions. Many would not desire to make the change. The operation of a yield tax on merchantable timber or young growth or both upon application by and agreement with the land owner might carry with it certain requirements to keep and maintain the areas classified in permanent forestry management. It should eventually supersede the present classification law. Such a measure taking effect gradually would permit of adjustment of losses with towns with the least burden upon the finances of the state. It is well to bear in mind however that there would arise questions as to the scale and methods of scaling and the means of determining stumpage values. Forest economists are rather opposed to the principle of special classification or the operating of a tax provision by contract. Further details regarding this system are being worked up

by the Interim Tax Commission and the State Tax Commission at the present time.

Extension of the Present Classification Law. This law has been in effect since 1923. Altogether 198 lots in 69 towns in nine counties have been classified with a total acreage of 8,431 acres. This is relatively little considering the large amount of dissatisfaction with the present taxes on woodland. Towns having classified land are well distributed, except there are none in Coos County. A few towns have as many as ten and thirteen lots classified, due to certain persons having been unusually active in advocating the measure among their townspeople. Many town assessors are opposed to granting classification and some try to defeat or nullify it in one way or another. They are fearful that widespread application will seriously impair revenues in their towns. Yet it has been shown that to date the average tax loss is about 20 cents per acre. If this fear could be removed by reimbursing towns for losses on account of areas classified, much of the objection of assessors would be removed.

The classification law is at present still too restricted to be of widespread application. The eligibility requirements of a maximum value of $25 per acre for growth alone and the promise of a prospective yield of 25,000 board feet per acre on the average result in many applications being refused either because there is too much value in growth at the time or else the growth is not sufficiently well stocked to promise the future required yield. If the law were to be easily applied, and attractive alike to assessors and land owners, necessary in order to be widely effective, the requirements of value and yield must be modified, larger areas than 100 acres per owner allowed, and towns should be compensated for their losses. Even with liberal terms of classification, the inherent weakness of the law is that merchantable and nearly merchantable timber suffers most under the general property tax and should be eligible for classification if it is to be permitted to stand to maturity. This leads at once

to the small tax received when classified timber is cut, based on the tax rate of the town, which is obviously not high enough and should be increased to 10 per cent of the stumpage value at the time of cutting, if the Constitutional objections can be satisfied. Carried to this degree the plan merges with the preceding plan of a yield tax.

Some Tax Laws of Other States. Nearly one-half the states throughout the country have one kind or another of special laws to encourage the growing of trees such as exemptions, bounties and special tax rebates conditioned upon certain requirements. Pages might be written descriptive of the proposals put on the statute books of different states. It is only fair to state that nearly all laws based upon special registration or classification dedicating land to the growing of timber and requiring certain conditions to be met or certain results to follow have so far not promised a solution of the forest tax problem. Several states are making good progress by special tax provision or in amending their constitutions to permit of legislating fairly on the subject. Minnesota and Wisconsin recently amended their Constitutions in order to legislate on forest taxation and California by Constitutional amendment now exempts all growing crops until mature.

Minnesota has a method of contracting with owners for the establishment of auxiliary forests, the owners paying a fixed land tax of 8 cents on a dollar of assessed value not including growth and a yield tax of 10 per cent of full and true value when timber is cut. In Wisconsin a tax on "forest crop" or cut over land of 10 cents per acre is matched by a like payment from the state, the latter to be eventually compensated through a yield tax of 10 per cent of the value of forest products when harvested. Michigan provides a modified yield tax on lands classified as commercial forest reserves. An annual tax of 5 cents on pine land and 10 cents on hardwood land is collected and the state pays an additional 5 cents per acre. The yield tax is 25 per cent of the value of the cut, one-half of which is re-

turned to the state. Louisiana has a 6 per cent severance tax on all lands under reforestation contracts for periods of 50 years.

Ohio and Indiana have modified classifications laws. The Ohio law permits classification of any ungrazed forest land, assessing an annual bare land tax of 50 per cent of the local rate on the true and actual value. A products tax of 5 per cent gross stumpage value is collected, half of which goes to the state. In Indiana any ungrazed forest land is eligible for classification and carries an exemption of all land and timber value above $1 per acre. The owner pays a 25 per cent tax on any increase in land value when the land ceases to be devoted to forestry. Most of the New England states and New York have classification laws of one form or another.

Classification laws with two or three exceptions start with cut over or land with little merchantable timber which is the kind of land suffering least under the general property tax at the present time. There is, however, merit in the fact that efforts are being made to start productive forests now, permitting exemptions for the benefit of the future and applying the tax on the yield when timber is cut. In most of the states these laws appear to fall short of attacking the tax difficulties where they are greatest, which is in the mature or partly grown timber of relatively high value at the present time.

AMENDMENTS TO THE FOREST LAWS IN 1927

The legislature made several changes in the forest laws which are now a part of the public laws and should be briefly mentioned. Sections 32, 34, 35, 36 and 37 of Chapter 191 of the Public Laws relating to forest protection were revised to read as follows:

SECT. 32. *Prosecutions.* When a District Chief or Forest Fire Warden has any reason to believe that any forest fire law has been violated he shall report to the state forester all the facts coming within his knowledge. The state forester shall then take such action as he deems necessary and shall be entitled to the advice and assistance of the Attorney General and the County Solicitors.

SECT. 34. *Permits.* (a) It shall be unlawful for any person to kindle or cause to be kindled a fire upon the land of another without first obtaining permission from the owner thereof or his agent, or upon public land without the written permission from the official caretaker thereof.

(b) No person shall kindle or cause to be kindled any fire or shall burn or cause to be burned any material in or near any woodlands, pasture, brush, sprout, waste or cut-over land, or where the fire may be communicated to such land, except when the ground is covered with snow, without first obtaining written permission from the forest fire warden of the city or town where the burning is to be done or without the presence of the warden or some person designated by him to superintend such burning. Permits issued by forest fire wardens shall be prepared by the state forester, who may make and adopt such reasonable rules and regulations as may be necessary to give effect to this provision.

SECT. 35. *Liability for Fires Without Permit.* Any person, by himself or agent causing or kindling a fire without permit of the forest fire warden, when such permit is

required by the foregoing Section, and also any person, by whose negligence or the negligence of his agents any fire shall be caused, shall be liable in a civil action for the payment to the town of the expenses incurred by the forest fire warden or deputy warden in attending or extinguishing such fire. The items of expense of said fire shall bear the written approval of the state forester.

SECT. 36. *Penalty.* Whoever is found guilty of violating any provision of Section 34 shall be fined not more than two hundred dollars, or imprisoned not more than sixty days.

Whoever causes or kindles a fire by any means, wilfully, or in a careless and imprudent manner, which shall endanger woodland as described in Section 34 (b) shall be fined not more than five hundred dollars or imprisoned not more than one year or both.

SECT. 37. *Camp Fires.* When permission has been obtained from the land owner or the official caretaker of public land, camp or cooking fires may be kindled without permission of the forest fire warden, at suitable times and in suitable places, when they will not endanger woodlands as described in Section 34 (b), except in such towns or cities as now have or may hereafter adopt by-laws or regulations requiring such permission.

Whoever shall kindle or cause to be kindled any such fire or use an abandoned fire in or near woodlands, shall totally extinguish the same before leaving it and upon failure to do so such person or persons shall be subject to the same liabilities and penalties as are prescribed in Sections 35 and 36.

Several changes were also made in the Arson Law, Chapter 391 of the Public Laws.

Chapter 130, Session laws, provides that all revenue derived from rentals and the sale of any products from state forests and reservations, except that received from the sale of nursery stock from the State Forest Nursery, shall for a period of ten years from the passage of this act be kept

by the State Treasurer in a separate account as a continuous fund to be known as the forest improvement fund from which payments may be made upon recommendation of the State Forester, with the advice and consent of the Governor and Council, for the purchase and improvement of state forests and reservations and buildings thereon.

Chapter 74 extended the provisions of Chapter 101, Session laws of 1925 for the acquisition by the State of the Franconia Notch until not later than April 21, 1930.

FOREST FIRE PROTECTION

Review of Forest Fire Conditions

RED HILL LOOKOUT TOWER
(Moultonboro)

Fire conditions existing in New Hampshire have previously been reviewed insofar as authoritative records of the past permitted. If these conditions remained constant, there would be little, if any, occasion to discuss the question now. While certain factors affecting the fire situation may fairly be said to continue unchangeable as, for instance, weather conditions, fire hazards change with the times, as everything else. Old hazards disappear and new ones are introduced.

Years ago forests were cut and the land burned purposely to make the land tillable. Today, such fires are controlled because good growing forest land has a value not existing in years gone by. Lumbering on a large scale covered vast areas with slash. Through the use of logging railroads and in other ways, these areas were almost certain to be burned. For the most part, logging railroads have disappeared. Portable saw mills began to be used with the advent of smaller logging operations and these were a great source of danger. Regulations governing the use of spark arresters and the latter day arrival of gasoline powered mills have practically controlled this hazard. Roadside slash was a fire menace for many years. Through the co-operation of lumbermen and others, this aid to the spread of fires is eliminated. Railroads have been responsible for many fires but today much energy is directed to the proper maintenance

of locomotives and more thorough patrol after trains as well as systematic burning of rights-of-way to make such ways fire-safe.

Brush burning and other uses of open fires have been and are now among the most serious causes of fire. While persons responsible for illegally kindled fires are required by law to reimburse those whom their fires may have damaged and the town for any expense their carelessness may have made necessary, in addition to being made liable to fine and imprisonment, a more strict enforcement of this law and more education in the dangers attending the injudicious kindling of open fires is imperative. It is one of our big fire prevention problems today.

The rapidly increasing use of automobiles has created additional fire hazards when considered from the point of view of woodland owners whose properties were hardly ever visited by tourists, campers, fishermen, hunters, berry and flower pickers but are now practically overrun by these people at certain periods of the year. This hazard does not fall far short of being our worst. Indirectly, automobiles have also created another hazard by reducing the demand for hay and consequently increasing the number of uncut grass fields. In 1928, more than ever before, this dangerous condition has been reported from many sources and from all sections. Much uneasiness is felt by owners of land adjoining these fields. Nothing is more inflammable than dry grass and it may well be that the day will come when owners of such fields may be required to make such lands safe by disposing of the hay through controlled burning or in some other manner.

The personnel of the fire warden service continues to be on a part time basis, being paid only when employed. This expense is shared by the towns and the State. Because of their proximity to the scene of necessary fire preventive work, it is felt that much work of a very valuable character, in addition to actual fire fighting, could be performed by the wardens if funds permitted.

Fire fighting equipment is being improved and many towns are increasing their supply. It is a deplorable fact, however, that many towns are woefully weak in this respect, depending almost entirely upon tools fire fighters may bring themselves and upon help from adjoining towns. No one denies that this condition is serious. The Department has a small appropriation with which it seeks to help such towns by offering to co-operate on a 50-50 basis in the purchase of the smaller tools such as shovels, water pails and pumps. The problem, however, is largely one for the towns and these should be urged more and more to give it their attention at annual town meetings.

FOREST FIRE RECORD FOR NINETEEN YEARS

(Exclusive of Railroad Fires)

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
1927	367	9,420	25.7	75,762.00	206.44
1928	271	4,714	17.4	27,090.00	99.96
Totals	6,441	178,100 A.		$1,397,810.00	

Average Number Fires Per Year	339
Average Area Burned Per Year	9,374 A.
Average Damage Per Year	$73,568.95
Average Area Burned Per Fire	27.7 A.
Average Damage Per Fire	$217.02

Fire Seasons of 1927 and 1928

The last two fiscal years under consideration have had identical characteristics insofar as the similarity of their respective spring and fall fire periods are concerned. Each year has had dry, dangerous spring seasons and compara-

tively favorable fall periods when fire occurrence was below normal. Fires in the fall of 1926 were rather evenly distributed over the period with slightly more than one-half of the fires occurring in July and August when they caused little damage. The spring season of 1927 witnessed the usual dry period which necessitated the proclamation of the Governor's ban on April 13, thus closing the woodlands to unauthorized use. This ban remained in effect until April 23. Only in 1892 has there been less rain during this proverbially wet month. Two bad fires occurred in this

CONCORD PLAINS FIRE, MAY, 1928

period. One in Chesterfield and Hinsdale burned 1,600 acres and another in Walpole and Langdon burned about 1,200 acres. The fall season of 1927 was even more favorable than the fall of 1926. Only 43 fires, excluding railroad fires, were reported by the wardens. None of these were serious. The spring season of 1928, the last six-month period now being reported, was quite active but plentiful rains delayed the peak of fire danger until May when this hazardous period caused a proclamation of the Governor closing the woodlands on May 14. This ban remained in effect only five days, being suspended on May 19. The largest fire of this spring period occurred in Concord when

an estimated area of 1,100 acres of sand-plain was burned.

During the biennial period, seventy-seven fires caused in an unlawful manner were settled by collecting the costs of putting them out from the persons responsible. This is an increase of twenty fires so settled over the previous biennial period.

The following tables give other fire information in the form previously used in our reports. It is interesting to note that the average area per fire in each of the two years has been less than the average for nineteen years. This is also true of the average damage per fire. Increasingly better fire fighting facilities and the continued good-will and co-operation of the wardens should continually reduce even these good averages.

NUMBER OF FIRES BY MONTHS

(Exclusive of Railroad Fires)

Fiscal Year Ending June 30, 1927		Fiscal Year Ending June 30, 1928	
July, 1926	37	July, 1927	20
August, 1926	30	August, 1927	3
September, 1926	26	September, 1927	5
October, 1926	9	October, 1927	9
November, 1926	3	November, 1927	5
December, 1926	1	December, 1927	1
January, 1927	0	January, 1928	0
February, 1927	0	February, 1928	0
March, 1927	15	March, 1928	2
April, 1927	176	April, 1928	96
May, 1927	37	May, 1928	121
June, 1927	33	June, 1928	9
Total	367	Total	271

FIRE RECORD FOR FISCAL YEARS 1927 AND 1928

(Exclusive of Railroad Fires)

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	1927	10	64	6.4	$281.00	$28.10	$271.16	$27.12
	1928	5	21	4.2	40.00	8.00	38.80	7.76
Carroll	1927	27	268	9.9	2,010.00	74.44	719.50	26.65
	1928	13	178	13.7	755.00	58.08	635.51	48.89
Cheshire	1927	38	3,348	88.1	18,913.00	497.71	4,183.28	110.09
	1928	28	377	13.5	7,205.00	257.32	967.45	34.55
Coos	1927	20	402	20.1	4,760.00	238.00	1,391.89	69.59
	1928	11	110	10.0	760.00	69.09	287.51	26.14
Grafton	1927	20	438	21.9	3,719.50	185.98	1,270.80	63.54
	1928	16	746	46.6	2,880.00	180.00	1,227.68	76.73
Hillsborough	1927	96	1,564	16.3	10,794.00	112.44	2,030.93	21.16
	1928	71	1,013	14.3	5,491.00	77.34	1,328.50	18.71
Merrimack	1927	34	222	6.5	1,141.50	33.57	556.01	16.35
	1928	45	1,626	36.1	5,295.00	117.67	1,770.73	39.35
Rockingham	1927	77	2,223	28.9	29,055.00	377.34	4,300.82	55.85
	1928	52	542	10.4	2,798.00	53.81	1,272.99	24.48
Strafford	1927	33	773	23.4	4,850.00	146.97	2,455.55	74.41
	1928	16	57	3.6	665.00	41.56	253.25	15.83
Sullivan	1927	12	118	9.8	238.50	19.88	228.96	19.08
	1928	14	44	3.1	1,201.00	85.79	243.45	17.39
Totals	1927	367	9,420	25.7	$75,762.50	$206.44	$17,408.90	$47.44
For State	1928	271	4,714	17.4	$27,090.00	$99.96	$8,025.87	$29.62

RAILROAD FIRE RECORD FOR FISCAL YEARS 1927 AND 1928

Year	No. Fires	Total Area Burned	Average Area Per Fire	Total Damage	Average Damage Per Fire
1927	195	1,108 A.	5.7 A.	$6,000.00	$30.77
1928	226	1,374	6.1	6,198.00	27.42

TOTAL NUMBER OF FOREST FIRES, AREA AND DAMAGE BY CAUSES

For Fiscal Years 1927 and 1928

CAUSES	Percent Total Number of Fires	Percent Total Area Burned	Percent Total Damage Caused
Railroads	39.49%	14.94%	10.60%
Smokers	30.11	47.52	34.13
Burning Brush	8.63	8.84	21.46
Miscellaneous	7.41	9.12	11.65
Lumbering	3.10	5.56	6.34
Incendiary	1.22	2.18	2.02
Lightning	1.13	.07	.09
Camp Fires	.56	.02	.06
Unknown	8.35	11.75	13.65
Totals	100.00%	100.00%	100.00%

COMBINED FOREST FIRE RECORD

For Fiscal Years 1927 and 1928
All Agencies Reporting

NUMBER OF FIRES

Year	Town	Railroad	White Mountain National Forest	Total
1927	367	195	4	566
1928	271	226	3	500
Totals	638	421	7	1,066

AREA BURNED

Year	Town	Railroad	White Mountain National Forest	Total
1927	9,420	1,108	11	10,539
1928	4,714	1,374	4	6,092
Totals	14,134	2,482	15	16,631

DAMAGE

Year	Town	Railroad	White Mountain National Forest	Total
1927	$75,762.50	$6,000.00	$2.00	$81,764.50
1928	27,090.00	6,198.00	6.00	33,294.00
Totals ...	$102,852.50	$12,198.00	$8.00	$115,058.50

Lookout Construction and Improvement

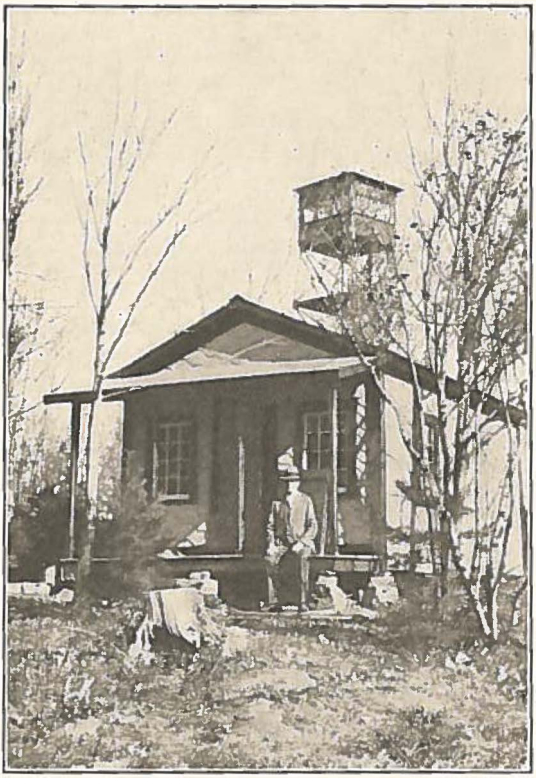
During this biennial period more has been accomplished along the line of lookout construction and improvement than for several years. The following is a review of the work done in 1927.

Early in the season a new station was constructed on Red Hill in Moultonboro. The tower, 27 feet in height, is of steel construction, with convenient stairs and a 10x10 foot enclosed wooden observation room at the top. The cabin, 12x18 feet is of the two room type thus providing an opportunity for the watchman to have separate sleeping quarters, not being obliged to cook, eat and sleep in the same room which is certainly very undesirable especially in the hot summer weather.

The telephone line about two miles in length was constructed by using No. 17 Bronze Parallel Pair covered wire laid on the ground. This type of telephone construction is proving very satisfactory, as the damage from wind storms is entirely eliminated.

The construction of this station at this time was made possible through the generosity of Mr. Ernest B. Dane of

Brookline, Massachusetts and a summer resident and large property owner at Center Harbor who donated the funds used in the construction of the tower and cabin. This station is operated in place of the one formerly on Mount Israel.



OAK HILL LOOKOUT STATION AND CABIN (Loudon)

A new tower of the same description as that on Red Hill was built on Stinson Mountain in Rumney. This has taken the place of the old wooden tower with open top which had become unsafe for use and was taken down and the new one erected in its place.

A new 35 foot wooden tower with an enclosed observation room 9x9 feet was built on Magalloway Mountain in

the town of Pittsburg, taking the place of the open top tower and thereby furnishing another station with enclosed room for the comfort and convenience of the watchman. The wooden tower on Deer Mountain also in Pittsburg has been rebuilt and the observation room thoroughly repaired.

One of the new two room type cabins was built on Croydon Mountain to take the place of the old log type which had become unsuitable for use. The material for this construction was donated and delivered at the top of the mountain by the Blue Mountain Park Association. The telephone line was improved at the station by laying about two miles of covered wire.

The line on Monadnock was improved by laying two miles and Kearsarge by laying about three-fourths of a mile of Parallel Pair wire. The pole line on Blue Job has been partially rebuilt and connected with the New England line at Rochester, thus eliminating the upkeep of about two miles of line in Strafford.

The following work was completed in 1928:

Through an agreement with Thomas A. Arnold, of Haverhill, Mass., (who donated the use of the land) a new station was constructed on Rock Rimmon, in the town of Kingston. The tower is of steel construction 45 feet high, with stairs and a wooden observation room 10x10 feet at the top. A new feature was adopted on this tower by building a platform at the steel section just below the observation room for the convenience of visitors. This platform covers the entire section and is equipped with a suitable railing. The cabin is of the two room type, 12x19 feet, and is built just at the base of the tower.

The telephone line connected with the Kingston Exchange consists of about one-half mile of pole line along the highway and across an open area, and one mile of Parallel Pair covered wire from the pole line to the station. Rock Rimmon is the first station to be operated in the southern portion of Rockingham County and covers territory not previously protected.

The second new station to be established and constructed this year was at Oak Hill in Loudon. In this case the use of the land was donated by Mr. Charles H. Cate of that town. This tower is steel 45 feet high having the same type of construction as Rock Rimmon. The cabin is of the two room type 12x18 feet built near the tower. The water supply for this station is obtained from a well which furnished the supply for a farm home long since abandoned and the buildings removed.

The telephone line of about three fourths of a mile was constructed by the use of Parallel Pair covered wire. Connected with the Concord Exchange, this is the first station in the state where common battery service can be used. The location is easily accessible as cars may be driven to the tower; in fact the material for construction was delivered at the top of the hill by truck.

On Mount Belknap, the steel tower built in 1915, was equipped with a ladder which was the usual type of construction used at that time for reaching the observation room. Owing to the ever-increasing number of visitors the ladder has been replaced with the same type of stairs used on all new construction.

For several years considerable unfavorable comment had been made with regard to the observation cabin on Mt. Monadnock and in 1927 the Department considered the advisability of making some change. Messrs. Fay and Thorndike, architects of Boston became interested and contributed their services in drawing plans and specifications for a cabin that would be found satisfactory to all concerned. These plans provided for building a stone base up to the observation windows with the top finished in wood and painted in such a manner as to blend with the ledge surroundings. These plans and specifications have been complied with and the new cabin built accordingly. Mt. Monadnock now has very unique and satisfactory observation quarters, without disfiguring the sky line of the mountain.

On Mount Kearsarge south a new two room cabin, 12x18

feet, has been built near the base of the tower; part of the lumber being taken from the old cabin, which for sometime has been too small and wholly unfit as quarters of the watchman. The telephone service is greatly improved by constructing a new pole line along the highway from Wilmot Flat to the mountain road, a distance of two miles. This is connected to about three-fourths of a mile of Parallel Pair line reaching the foot of the mountain, and from this point to the summit the wire is strung on trees. The tree-line will soon need to be replaced with the new type of covered wire.

The telephone line at Pawtuckaway has been thoroughly brushed out and rebuilt along the highway leading to the base of the mountain.

A new log cabin on Mount Carrigain was built by the watchman and a helper during the summer of 1928. The old cabin had been in use continuously since the opening of this station and had long passed its period of usefulness. Owing to the difficulty of toting necessary building materials, the cabin had to be made of round wood cut on the mountain with only so much of manufactured material as was necessary to finish the job.

The Department has also co-operated with the U. S. Forest Service in establishing a new station on Mt. Hale in the town of Carroll.

During this biennial period many minor repairs have been made on towers, cabins and telephone lines, improved equipment has been purchased for the use of watchmen, all of which have contributed much to improve the lookout service.

LOOKOUT STATIONS

Name and Location	Established	Tower	Cabin	Telephone Line and Exchange	†Location and ‡Condition of Trail	No. Visitors Reported 1927	1928
Mt. Agassiz, Bethlehem	1910	*25 feet steel with stairs. Small observation room.	None	½ mile pole line Bethlehem.	From W. S. Phillips House Carriage road to top.	Privately operated. No record.	
Mt. Belknap, Gilford	1912	24 feet steel. Built with stairs. 1915. Enclosure 10x10 feet.	200 feet from tower 9x22 feet. 2 rooms.	2 miles tree line Laconia.	South from Gilford Village to Morrill Farm. Good trail 2 miles.	1,865	2,073
Black Mt, Benton	1911	20 feet steel. 1925 with stairs. Enclosure 10x10 feet.	100 feet from tower 9x22 feet. 2 rooms.	3 miles pole and tree line Pike.	East Haverhill Lime Kiln Road. Fair trail 2½ miles.	456	458
Blue Job Farmington	1912	24 feet steel. 1915 with ladder. Enclosure 10x10 feet.	50 feet from tower, 9x13 feet. 1 room.	2 miles pole and tree line. Rochester.	Center Strafford to Farmington to Pinkham Farm. Excellent trail ½ mile.	954	950
Cabot Mt. Kilkenny		50 feet steel with stairs. 1924. Enclosure 7½x7½ feet.	100 feet from tower, 12x16 feet. 1 room.	5 miles pole and tree line. Lancaster.	Lancaster to White's House on Grange or Red Brook. Fair trail 5 miles.	252	267
Carrigain Mt. Livermore	1910	None	1/3 mile from top. 10 x 14 feet. 1 room.	5 miles tree line. No. Conway. 3 miles insulated. Lincoln.	Bartlett to Saunder's Mill in Livermore. Fair trail 6 miles.	None reported	113
Cardigan Mt. Orange	1924	15 feet steel 1924 with ladder. Enclosure 10x10 feet.	½ mile from tower, 10x12 feet. 1 room.	2 miles tree line. ½ mile insulated wire. Canaan.	Canaan to Orange. Good trail 2 miles. Alexandria to old Clark Farm. Good trail 2 miles.	1,648	1,094
Croydon Mt. Croydon	1909	18 feet steel 1920 with ladder. Enclosure 10x10 feet.	75 feet from tower, 12x16 feet. 2 rooms.	4 miles pole and tree line. Newport.	Blue Mountain Park Assn. Central Station. Park Road and good trail 4 miles.	108	127

Deer Mt. Pittsburg	1911	30 feet wood with ladder. Enclosure 9x9 feet.	¼ mile from tower, 10x20 feet. 2 rooms.	6 miles ground line. Idlewild Camp.	Idlewild Camp, Pittsburg via old tote road. Good trail 6 miles.	45	11
Green Mt. Effingham	1922	50 feet steel with ladder. Enclosure 9x9 feet.	250 feet from tower, 12x16 feet. 1 room.	1½ miles tree line ½ mile insulated wire. Mountainview.	Effingham Falls to Marsh Place. Good trail 2 miles.	384	460
Jeremy Hill, Pelham	1918	50 feet steel with ladder. Enclosure 10x10 feet.	50 feet from tower, 12x16 feet. 2 rooms.	3 miles pole and tree line. Nashua.	Nashua through Hudson to Pelham. Cars may be driven to station.	505	307
Jodrie Hill, Milan	1925	30 feet wood with ladder. Enclosure 9x9 feet.	40 feet from tower, 9x16 feet. 1 room.	½ mile pole line. Milan.	Milan to Groveton. Excellent trail ¼ mile.	268	504
Kearsarge, Warner	1912	27 feet steel with stairs. Enclosure 10x10 feet.	75 feet from tower, 12x18 feet. 2 rooms.	2 miles pole line, 1 mile parallel pair, 1 mile tree line. New London.	Warner to foot of Mt. Trail old road 4 miles Wilmot to Winslow House site. Fair trail 1½ miles.	4,492	3,945
Magalloway, Pittsburg	1910	35 feet wood with ladder. Enclosure 9x9 feet.	¾ mile from tower, 9x13 feet. 1 room.	7 mi. ground line. First Conn. Lake. 2 miles ground line. Brown Camp.	Pittsburg to dam at First Conn. Lake. Fair trail 7 miles.	332	20
Mt. Monadnock Jaffrey	1912	Enclosure built of rock and wood on ledge 10x14 feet. 1928.	1½ mile from top, 10x6 feet. 1 room.	1 mile tree line. 1½ mile parallel pair. East Jaffrey.	Jaffrey to Mountain road, and Half Way House. Excellent trail 1 mile. Many other good trails.	9,868	8,461
Oak Hill Loudon	1928	45 feet steel with stairs. Enclosure 10x10 feet.	50 feet from tower, 12x18 feet. 2 rooms.	¾ mile parallel pair. Concord	Potter Street, East Concord to Loudon Village. Cars may be driven to station.		377
Pitcher Mt. Stoddard	1915	25 feet steel with ladder. Enclosure 10x10 feet.	25 feet from tower, 8x10 feet. 1 room.	½ mile pole line. Hancock. 3 miles pole line. Keene.	Marlow to Stoddard. Excellent pasture trail ½ mile.	1,073	1,238

LOOKOUT STATIONS

Name and Location	Established	Tower	Cabin	Telephone Line and Exchange	†Location and ‡Condition of Trail	No. Visitors Reported 1927	1928
Pawtuckaway Mt. Nottingham	1912	24 feet steel with ladder. Enclosure 10x10 feet.	200 feet from tower, 9x13 feet. 1 room.	3 miles pole line. ½ mile tree line. Deerfield.	Raymond to Deerfield Center. Old road to Goodhue Place. Good trail ½ mile.	422	594
Red Hill, Moultonboro	1927	27 feet steel with stairs. Enclosure 10x10 feet.	50 feet from tower, 12x18 feet. 2 rooms.	2 miles parallel pair. Center Harbor.	Center Harbor opposite boat landing to Sibley Farm. Excellent trail 2 miles.	2,060	1,970
Rock Rimmon, Kingston	1928	45 feet steel with stairs. Enclosure 10x10 feet.	40 feet from tower, 12x19 feet. 2 rooms.	½ mile pole line. 1 mile parallel pair. Kingston.	Old road Kingston to Danville. Excellent trail ½ mile		582
Signal Mt. Millsfield	1911	30 feet wood with ladder. Enclosure 9x9 feet.	50 feet from tower, 10x16 feet. 1 room.	4 miles ground line. Errol.	State Road Errol to Dixville Notch. Fair trail 2 miles.	19	24
Stinson Mt. Rumney	1911	27 feet steel with stairs. Enclosure 10x10 feet.	900 feet from tower, 9x16 feet. 1 room.	3½ mile tree line. Rumney.	Rumney P. O. to Stinson Lake then to foot of mountain. Fair trail 2 miles.	120	354
Sugar Loaf Mt. Stratford	1910	Enclosed wooden building on ledge at summit. 7x7 feet.	None	2 miles ground line. Odell Camps.	Groveton to Milan. Old tote road up Nash Stream. Good trail 2 miles.	17	9
Uncanoonuc Goffstown	1911	60 feet steel with stairs. Enclosure 7½x7½ feet.	None	Maintained by N. E. Tel. Co. Goffstown.	Shirley Hill Road to Base Station. Can be reached by inclined Railway. Excellent trail 1 mile.	6,371	4,244
				74 miles		32,353	29,452

*To floor of observation rooms which are about 10 feet high.
†Signs at main roads marked N. H. Fire Lookout giving name of station.
‡Trails marked with arrow N. H. Fire Lookout Station.

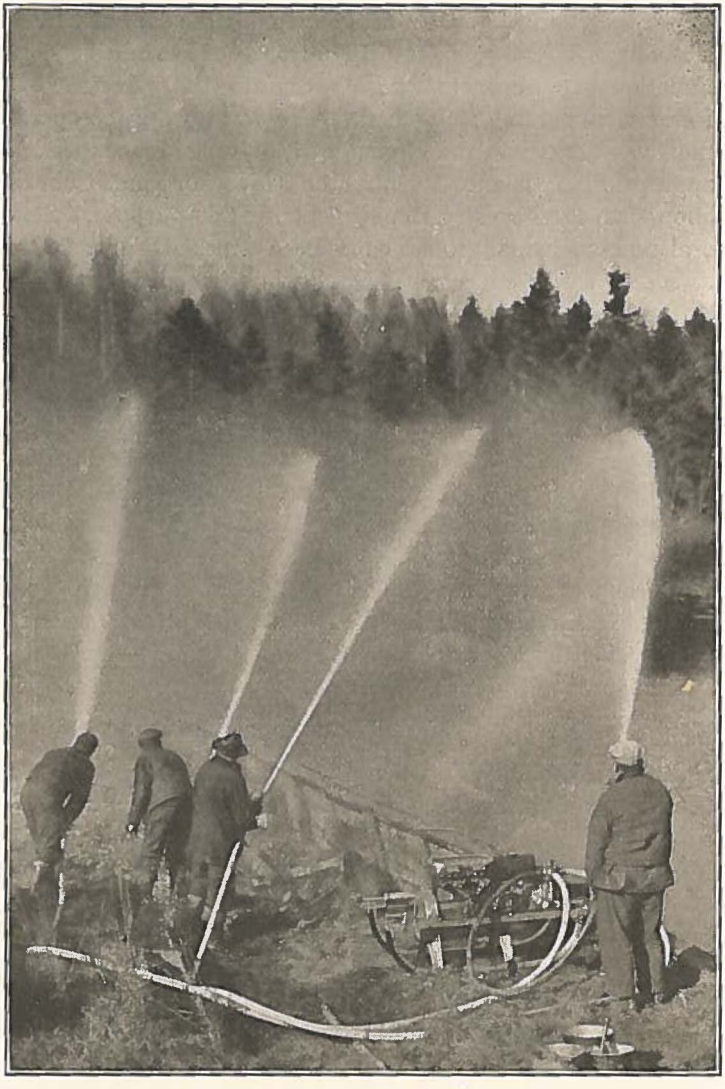
Forest Fire Fighting Equipment

The Legislature of 1927 made available the sum of $1,000 annually for two years for the purpose of permitting continuation of co-operation with towns in the purchase of forest fire fighting equipment. Previously, our co-operation was limited to the expenditure of certain unexpended appropriation balances which the Governor and Council allotted to the Forestry Department for this purpose. Several types of small tools have been stocked for sale to towns on a 50-50 basis. The following list gives the price to the towns.

Long-handled, round-pointed shovels	$9.00 doz.
Short-handled, round pointed shovels	8.25 doz.
Hoes	5.25 doz.
Extra-heavy rakes	6.00 doz.
Handled axes	8.00 doz.
Handled mattocks (grub-hoes)	6.75 doz.
Galvanized iron pails	3.50 doz.
Lanterns	6.50 doz.
Knapsack sprayers	2.75 each
Chemical extinguishers	4.50 each
Water pumps (Pyrene)	5.00 each
Water pumps (double-forester)	10.00 each

Since July 1, 1927, when the equipment appropriation became available, some nineteen towns have purchased supplies. These include the towns of Weare, Meredith, Merrimack, Hanover, Candia, Kingston, Swanzey, Durham, Andover, Wolfeboro, Langdon, Hampton Falls, Grantham, Ossipee, Wentworth's Location, Deering, Dartmouth College Grant, Newbury, and Richmond. There is room for much more activity in this direction and it is hoped that many more towns will add to their equipment of fire fighting tools from this source.

The State also maintains seven motor pressure fire pumps for use in towns whenever necessary. The cost of operation, when used at fires, is divided equally between the State



FOREST FIRE PUMP IN ACTION

Photo by Morgan

and the town in question. Each of the fire districts has one of these motor pumps, with the exception of the district covering the southern portion of the State, which has two. A new pump has also been located in Franconia Notch.

Railroad Forest Fire Protection

The section foremen of the four railroads operating in New Hampshire are appointed annually Deputy Forest Fire Wardens for their respective jurisdictions. This force numbers nearly 200 men, ten of whom are specifically designated as patrol car operators whose sole duty it is to patrol after trains in dangerous times.

The State co-operates with this group of men by (1) conferring upon them the authority of Deputy Forest Fire Wardens giving them legal status in summoning assistance to fight fires; (2) assisting them to make the rights-of-way fire-safe by bringing about the proper disposal of lumber slash left within sixty feet of these rights-of-way.

Locomotive maintenance is carried out by the railroads in accordance with a system in force whereby periodic inspections are made of front-ends and ash-pans and repairs ordered when these parts are found defective. Rights-of-way are also burned under control so as to help prevent the start of fires. While the number of fires attributed to the railroads may seem disproportionately large, it will be seen by consulting the records that the area burned and damage caused comparatively is less than the average for other fires. While the character of much of the country through which railroads run is partly responsible for this result, much credit must be given the organization devoted to the task of preventing railroad fires.

Patrol

The New Hampshire Timberland Owners' Association has continued to maintain a force of patrolmen in the northern part of the state during the biennial period, employing

twenty-two men in 1927 and twenty-one in 1928. Some additional patrol routes were maintained jointly by the Brown Company of Berlin and the Maine Forest Service where the territories covered extended into Maine. Twenty-four small fires were discovered and extinguished by the patrolmen during the two years and nearly 10,000 persons were warned against carelessness in the woods. The State co-operates with the Association by appointing its patrolmen as Deputy Forest Fire Wardens.

An experimental motorcycle patrol was maintained by the State in the South District with headquarters in Keene. Clyde L. Witham, formerly a state land patrolman and lookout watchman of the Department was employed to do this work. The patrol began March 18 and continued to May 19. The work was under the supervision of District Chief Charles F. Young and consisted of giving him assistance in the investigation of fires caused unlawfully as well as performance of other fire prevention work. Much valuable assistance was rendered and the patrol will be maintained in the future if satisfactory arrangements can be made.

Portable Saw Mills

In 1925, the law relating to the operation of portable steam saw mills was amended to extend certain regulatory measures to portable saw mills deriving power from gasoline or kerosene engines. Thus, all portable saw mills were required to be registered annually. A permit to operate was required for each new setting. The spark arrester sections affecting steam mills were strengthened and slash disposal around all portable mills for a distance not less than one hundred feet was also made mandatory, with a provision for exceptions under certain circumstances.

The law which has now been in effect nearly four years has been very effective in regulating the operation of portable mills to prevent fires. Such mills have been responsible for a great number of fires in the past. Today, this cause of fires is well under control. Some lumbering fires

of the past biennium may have been caused by steam mills but investigations did not bear out such contentions.

In 1927, 254 mills were registered, including 177 steam mills and 77 gasoline or otherwise powered mills. In 1928, 248 mills registered for the year were made up of 162 steam mills and 86 gasoline mills. Throughout the nearly four years that the registration law has been in effect, there has been a trend in favor of the lighter, more portable gasoline saw mills. In 1928, for the first time, steam mills lost their lead over gasoline mills of more than two to one. Gasoline mills representing 26 per cent of all mills in 1927 sawed 42 per cent of the lots operated that year. In 1928, when they were 35 percent of all portable saw mills, they sawed about 41 per cent of the lots operated. The total number of permits to operate issued in 1927 was 459 compared with 439 in 1928.

While the advent of gasoline mill operations is responsible for part of the fine fire record of portable saw mills as a whole, steam mill men must be given credit for the exercise of a great deal of care in operating their mills. They have complied with all reasonable demands of the Forestry Department and this co-operation has been largely responsible for the greatly improved fire record of their group.

FOREST FIRES IN NEW HAMPSHIRE 1921-1925

The following report on forest fires in New Hampshire 1921 to 1925 by Samuel T. Dana, formerly Director of the Northeastern Forest Experiment Station and now Dean of the School of Forestry and Conservation of the University of Michigan, was tabulated and prepared as the result of co-operation with the Forest Experiment Station whereby the fire records of each year are being compiled and analyzed by the station in order to improve past records and increase the efficiency of our forest fire service. Other northeastern states are co-operating with this station in a similar manner. Changes in the forest fire report form were made in 1927 as the need became evident from compilations already started at that time by the station. The analysis of records 1921 to 1925 was much more difficult and less complete than will be the case of an analysis made for the years 1926 to 1930.

The present report by Mr. Dana was intended primarily to be a study in detail of all fires handled by the town warden organization. The bulk of railroad fires are not so handled. Railroad section foremen function as a part of the fire organization whose problem it is to prevent and suppress railroad fires. Under the law railroads are liable for all damages caused by their fires and for the payment of all expenses incurred in extinguishing them. Reports of these fires are not available in the same manner or to the same degree as town fires handled under the immediate supervision of the towns and state. A few reports of railroad fires in charge of town wardens were included inadvertently in the basic records compiled by the Experiment Station. The railroad fire situation therefore appears to be of a negligible character when it is far more serious and for this reason a true picture of the railroad fire conditions is not presented. This inclusion of a few railroad fires, however, forms so small a percentage of all the fires considered

and affects statistics and conclusions to such a small degree that the report can be considered an analysis of the fires handled by the town warden organization.

Much difficulty was experienced due to the absence of certain information from the fire reports. Some of this information should have been available and other factors not previously required in our report forms have since been added. It is not always possible to have the fire reports completely and accurately made. It is hoped that the wardens will see from reading this analysis how dependent we are on the thoroughness of their reports.

Those who are familiar with our fire records and conditions in the state will also find within this analysis statistics or conclusions which seem inconsistent or even inaccurate. This is particularly true with reference to railroad fires for reasons already given. We must bear in mind that statistics while telling the truth may give wrong impressions. A single disastrous fire as in Grafton County almost unfairly appears to destroy the otherwise fair record of the entire county.

It is not only of interest but a real service to our forest fire organization, however, to have this complete and interesting analysis of the forest fire situation in New Hampshire over a period of five years. Professor Dana has pointed out certain defects which the wardens, district chiefs and lookout watchmen all can help to overcome and he has suggested lines of attack which we will endeavor to follow up. His diagnosis of New Hampshire's forest fire ills is a matter for continued scientific study.

JOHN H. FOSTER,
State Forester.

FOREST FIRES IN NEW HAMPSHIRE 1921-1925

By Samuel T. Dana,

Formerly Director Northeastern Forest Experiment Station

Introduction

Reports on individual forest fires in New Hampshire have for many years been filed with the State Forester at Concord. These constitute much more than merely a fire history of the state. Properly analyzed and interpreted they furnish also a valuable means of appraising both the fire hazard and the effectiveness of the fire control organization. They therefore lie at the very base of any intelligent effort to strengthen the protective system.

The more obvious facts brought out by the reports have always been used to good advantage for this purpose. The present statement constitutes a more detailed analysis for the 5-year period from 1921 to 1925 inclusive. Because of the numerical nature of the data and the desirability of visualizing this as far as possible the facts are presented mainly in the form of graphs with only enough text for necessary explanations and comments on the figures. Since a record of this sort becomes increasingly valuable with the length of the period covered it is hoped that similar analyses can be made for subsequent years with averages at 5-year intervals.

The study has been made in co-operation between the New Hampshire State Forestry Department and the Northeastern Forest Experiment Station. Grateful acknowledgment is hereby made to the many members of both organizations who have participated in the compilation and analysis of the data.

In considering the results presented it is important to bear in mind the fact that reports on individual fires necessarily vary considerably both in accuracy and completeness.

Reports are supposed to be submitted for all fires in the state, but it is too much to expect that this will actually be the case or that all wardens will be equally careful about reporting all fires in their districts. Some wardens also take particular pains to get at all the facts and to report them fully and accurately, while others are inclined to answer only a few of the questions asked and to guess at the information called for in these. Furthermore, inconsistencies and inaccuracies arise even in the most conscientiously prepared reports because of the fact that certain data, such as the area burned and the value of timber destroyed, are based on estimate rather than on actual measurement. The element of judgment consequently enters to a large extent in much of the information supplied.

This situation means that many of the facts apparently brought out by the records must be taken with the proverbial "grain of salt". On the other hand, the reports are probably fairly uniform in completeness and accuracy as between different years, more so perhaps than as between different counties. Furthermore, the statistics properly interpreted do serve to corroborate or to cast doubt upon general conclusions based upon observation only, and also bring out facts that might otherwise be overlooked. Most important of all perhaps, an analysis such as that presented herewith calls attention both to the inadequacy of the existing records and to the assistance that might be derived in increasing the effectiveness of fire protective measures from more complete and accurate reports. It is difficult to overemphasize the value of really dependable fire records extending over a considerable period of years.

Land Area, Population, and Forest Area of State

The forest fire records can hardly be interpreted properly without taking into consideration the total land area and population of the state and the relation of forest area to these. Information on these points by counties and groups of counties is given in Tables 1 and 2.

The division into groups of counties is based largely on differences in the character and extent of the forests and in density of population. In the southern group (Belknap, Cheshire, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan counties) the forest is composed largely of white pine and various hardwoods such as oak, maple, ash, and gray birch, and is fairly well broken up by farm lands and villages. In the northern group (Carroll, Coos, and Grafton counties) the characteristic trees are spruce, balsam fir, yellow birch, beech, and maple, and there are large areas of practically unbroken forest. Forest types do not, however, follow county lines and the southern portions of Carroll and Grafton counties really belong in the southern group from the standpoint of forest conditions. On the other hand, Sullivan County is in some respects more like the northern than the southern group of counties. It contains less pine and more hardwoods than the rest of the southern group, is generally high in elevation, and has a relatively sparse population. While this situation places these three counties in a more or less intermediate position, the division is probably as satisfactory a one as can be made along county lines and serves to bring out more clearly than would otherwise be possible some of the more important differences between the northern and southern parts of the state.

TABLE NO. 1

LAND AREA* AND POPULATION OF NEW HAMPSHIRE

County	Land Area		Population (1920)		Number
	Acres	Per Cent	Total Number	Per Cent	Per Square Mile
Southern Group					
Belknap	254,080	4.4	21,178	4.8	53
Cheshire	465,920	8.1	30,975	7.0	43
Hillsborough	572,800	9.9	135,512	30.6	151
Merrimack	596,480	10.3	51,770	11.7	56
Rockingham	442,240	7.7	52,498	11.8	76
Strafford	242,560	4.2	38,546	8.7	102
Sullivan	337,280	5.8	20,922	4.7	40
Total or Average ..	2,911,360	50.4	351,401	79.3	77
Northern Group					
Carroll	611,200	10.6	15,017	3.4	16
Coos	1,150,720	19.9	36,093	8.1	20
Grafton	1,106,560	19.1	40,572	9.2	23
Total or Average ..	2,868,480	49.6	91,682	20.7	20
State					
Total or Average ..	5,779,840	100.0	443,083	100.0	49

* Based on Census Bureau figures and differs from land area given in Forestry Commission's report for 1923-24. (John H. Foster).

TABLE NO 2.

FOREST AREA OF NEW HAMPSHIRE

County	Acres	Per Cent	Per Cent of Land Area	Acres per Capita
Southern Group				
Belknap	181,298	4.1	71.4	8.6
Cheshire	337,742	7.6	72.5	10.9
Hillsborough	401,724	9.1	70.1	3.0
Merrimack	440,961	9.9	73.9	8.5
Rockingham	276,602	6.2	62.5	5.3
Strafford	160,975	3.6	66.4	4.2
Sullivan	253,458	5.7	75.1	12.1
Total or Average ..	2,052,760	46.2	70.5	5.8
Northern Group				
Carroll	494,835	11.2	81.0	33.0
Coos	1,046,272	23.6	90.9	29.0
Grafton	840,926	19.0	76.0	20.7
Total or Average ..	2,382,033	53.8	83.0	26.0
State				
Total or Average ..	4,434,793	100.0	76.7	10.0

It is interesting to note that while the two groups of counties have practically identical land areas the southern group has nearly four fifths of the population. In terms of density of population the number varies from 16 per square mile in Carroll County to 151 per square mile in Hillsborough County. For the northern group as a whole there are only 20 persons per square mile as compared with 77 for the southern group, and 49 for the entire state.

In spite of its much denser population, the southern part of the state does not fall so much below the northern part in extent of forest area. With approximately equal total land areas, the southern part has 46 per cent of the total forest area as against 54 per cent in the northern part. Looked at from a somewhat different angle, the relation of forest area to land area varies from 70.5 per cent in the southern group to 83 per cent in the northern group. Rockingham County, with 62 per cent of forest land, has the smallest relative amount of forest, while Coos County, with 91 per cent, has the largest. These figures show an exceptionally high percentage of forest land, both in individual counties and in the state as a whole, with a comparatively small range between the most and least forested counties.

Forest area per capita, which furnishes an excellent index as to the "wildness" of a region, varies from 3.0 in Hillsborough County to 33.0 in Carroll County,—a difference of 1,000 per cent. By groups of counties the forest area per capita runs from 5.8 in the southern group to 26.0 in the northern group with an average of 10.0 for the entire state. These differences in total forest area and in forest area per capita are, of course, reflected in the number and size of fires in different parts of the state.

It is rather interesting to compare New Hampshire with Maine, which can also be divided into a northern and southern group of forests on the basis of forest conditions. In Maine the northern group of counties, which is likewise characterized by stands of spruce, balsam fir, and northern hardwoods, is five times the size of the southern group and

contains somewhat less than half of the population. The ratio of forest area to total land area is the same in the northern group of counties in both states (83 per cent), while in the southern group it runs much higher in New Hampshire (70 per cent as against 54 per cent). For the states as a whole the ratio is practically the same,—77 per cent in New Hampshire and 78 per cent in Maine. Much more difference exists in the relation of forest area to population. This runs as low as 1.9 in Androscoggin County, Maine, as against a minimum of 3.0 in Hillsborough County in New Hampshire. On the other hand, the maximum runs as high as 106.0 in Piscataquis County, Maine, as against 33.0 in Carroll County, New Hampshire. In general, southern Maine is more densely populated than southern New Hampshire and northern Maine much less densely populated than northern New Hampshire. For the states as a whole the forest area per capita is nearly twice as great in Maine as in New Hampshire.

Summary of Five-Year Record

The outstanding facts of the fire record for the five-year period from 1921 to 1925 are summarized briefly by years in Table 3 and by counties in Table 4.

All of these items will be discussed in detail in subsequent portions of this report. For present purposes it is perhaps sufficient to call attention to two facts: 1. While there is considerable variation in the number of fires, area burned, value of timber destroyed, and cost of fire suppression as between different years, this variation is not nearly as great as in many states. 2. Both fire danger and fire damage are much greater in the southern than in the northern group of counties.

TABLE NO. 3

NUMBER OF FIRES, AREA BURNED, VALUE OF TIMBER DESTROYED, AND COST OF FIRE SUPPRESSION, 1921-1925

	1921	1922	Average Per Year 1923	1924	1925	1921-25
Number of Fires						
Total	331	286	295	481	281	335
Per 100,000 acres of forest land	7.5	6.5	6.7	10.8	6.3	7.6
Per 10,000 population	7.5	6.5	6.7	10.9	6.3	7.6
Area Burned						
Total, acres	7,140	8,833	7,974	5,916	5,021	6,977
Per cent of forest area	0.16	0.20	0.18	0.14	0.11	0.16
Per fire, acres	22	31	27	12	18	21
Value of Timber Destroyed						
Total, dollars	20,433	29,116	20,691	46,841	32,253	29,867
Per fire, dollars	62	102	70	97	115	89
Per acre burned, dollars	2.86	3.30	2.59	7.92	6.42	4.28
Per acre of forest land, mills	4.61	6.57	4.67	10.56	7.27	6.73
Cost of Suppression						
Total, dollars	24,231	10,312	11,194	21,901	8,776	15,283
Per fire, dollars	73	36	38	46	31	46
Per acre burned, dollars	3.39	1.17	1.40	3.70	1.75	2.19
Per acre of forest land, mills	5.46	2.33	2.52	4.94	1.98	3.45

TABLE NO. 4

NUMBER OF FIRES, AREA BURNED, VALUE OF TIMBER DESTROYED, AND COST OF FIRE SUPPRESSION BY GROUPS OF COUNTIES, 1921-1925.

	Average Per Year Southern Group	Northern Group	Entire State
Number of Fires			
Total	261	74	335
Per 100,000 acres of forest land	12.7	3.1	7.6
Per 10,000 population	7.4	8.1	7.6
Area Burned			
Total, acres	4,707	2,270	6,977
Per cent of forest area	0.23	0.10	0.16
Per fire, acres	18	31	21
Value of Timber Destroyed			
Total, dollars	21,876	7,991	29,867
Per fire, dollars	84	108	89
Per acre burned, dollars	4.65	3.52	4.28
Per acre of forest land, mills	10.66	3.35	6.73
Cost of Suppression			
Total, dollars	9,141	6,142	15,283
Per fire, dollars	35	83	46
Per acre burned, dollars	1.94	2.71	2.19
Per acre of forest land, mills	4.45	2.58	3.45

Number of Fires

The number of forest fires in any given region is the simplest index of the fire danger. It gives a numerical expression for the so-called "risk of kindling" and is usually the first item to be considered in any analysis of the fire problem, since a knowledge of the number of fires that must be dealt with is obviously of prime importance in building up a protective organization.

Figure 1 shows the number of fires by individual years from 1921 to 1925 in comparison with the average for the five-year period. While the figures are undoubtedly not complete, they are probably more nearly so than for any of the other items under consideration. Taking them at their face value, they indicate a rather surprising uniformity in number of fires per year. The worst year (1924), with 481 fires, showed an increase of 71 per cent over the best year (1925), with 281 fires. If we leave out of consideration 1924, in which the exceptionally large number of fires was caused by an October with practically no rain, we find that the difference between the number of fires in 1921 (the next worst year to 1924) and 1925 was only 18 per cent. Approximately half of the fires during the 5-year period occurred in 1921 and 1924, and the other half during the remaining three years.

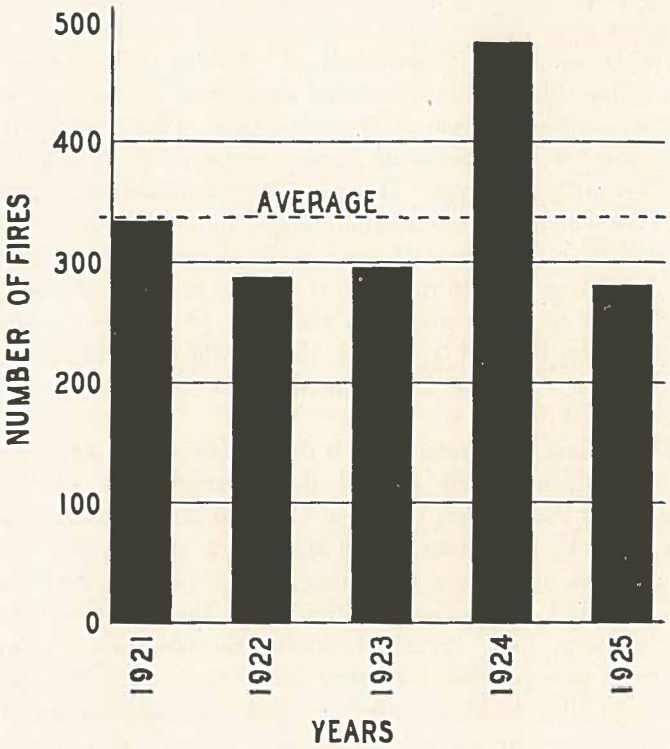
The variation between years is due chiefly to weather conditions, which largely control the inflammability of the forest. If the weather record at Concord can be taken as a fair index of conditions in the state as a whole, the fire danger was apparently somewhat above normal for the entire period under consideration from the standpoint of precipitation alone. Weather Bureau records show a deficiency in precipitation for every year varying from 3.09 inches in 1922 to 11.50 inches in 1924, with an average of 6.13 for the entire period. Too much reliance should not, however, be placed on averages of this sort, which are indicative rather than conclusive. Weather conditions frequently vary in different parts of the state at the same time,

so that for any thorough study of the subject records should be available from a large number of stations located in different parts of the state at different altitudes and in

FIG. 1

TOTAL NUMBER OF FIRES PER YEAR

1921-1925



different forest types. Furthermore, for any really adequate analysis of the influence of weather conditions on the fire hazard it is necessary not only to know the precipitation

at some particular time and place but also to take into consideration such other important factors as relative humidity, temperature, and wind movement. This is particularly true for a state like New Hampshire in which the varied topography and forest conditions make any generalizations as to weather conditions and their effect both difficult and dangerous. The entire subject is one which deserves, and is now receiving, detailed study.

The risk of kindling is also influenced by the character and condition of the forest, by the number of people visiting it, and by the care which they exercise in the use of fire. The growing tendency toward heavier cutting in logging operations and the steadily growing number of tourists who are flocking into New Hampshire in greatly increased numbers have undoubtedly added in recent years to the fire hazard.

Taking everything into consideration, it seems likely that the average number of fires per year for the 5-year period under consideration is as low as can reasonably be expected in the future. Preparations should therefore be made for handling about 335 fires a year in normal seasons and 480 or more in exceptionally unfavorable seasons. The fact that there will be occasional years with fewer fires does not permit any relaxation in vigilance, since an effective fire control organization must be based on the maximum danger. It is the infrequent bad years rather than the normal ones which cause the greatest loss and against which special precautions must therefore be taken.

For some purposes, as for example to facilitate comparison with other states, the relation of number of fires to forest area and to population is of more interest than the absolute number. With respect to the number of fires for every 100,000 acres of forest land, it is interesting to note that New Hampshire, with 7.6, runs considerably higher than three such dissimilar states as Maine,* Vermont, and Minnesota, with 0.9, 2.7, and 3.9 respectively. From the

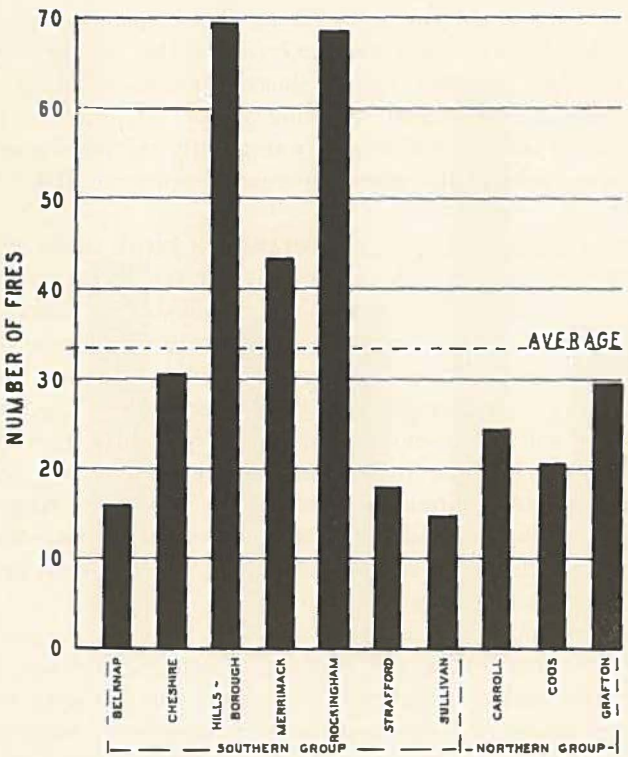
* It is understood that many fires outside the so-called "Forestry District" in Maine are not reported. (John H. Foster)

standpoint of population New Hampshire shows an average of 7.6 fires for every 10,000 inhabitants as against 1.8 for Maine and 2.9 for Vermont. The comparatively high

FIG. 2

TOTAL NUMBER OF FIRES PER YEAR BY COUNTIES

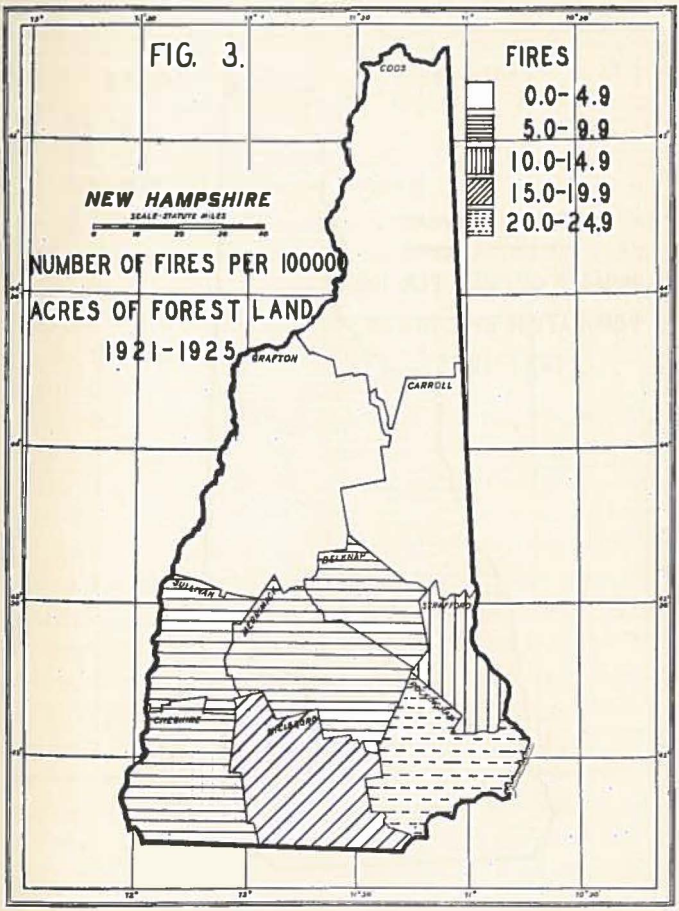
1921-1925



figures for New Hampshire are probably due in large part at least to the tremendous annual influx of summer visitors.

The distribution of fires by counties for the 5-year period as a whole is shown in Figure 2. This brings out strikingly the greater danger of fires starting in the southern group of

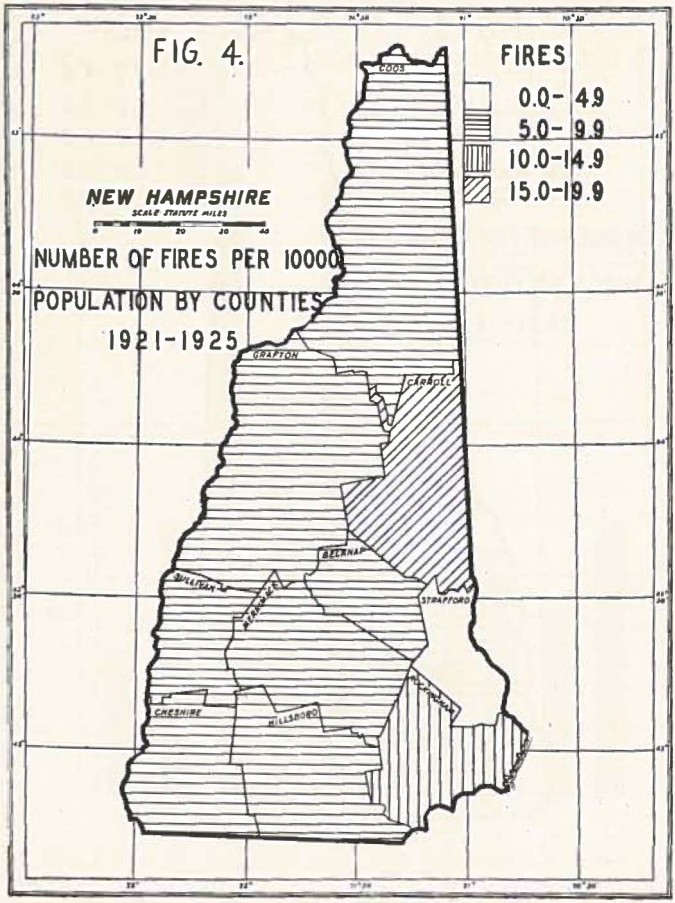
counties, which with 46 per cent of the forest area had 78 per cent of the total number of fires. Expressed somewhat differently, the number of fires for every 100,000 acres of



forest land was 12.7 in the southern group of counties as against 3.1 in the northern group. Coos County had the best record, with 1.9 fires per 100,000 acres of forest land, and Merrimack County the worst, with 24.9. (See Figure 3)

These differences are undoubtedly due chiefly to the

greater concentration of population in the southern part of the state. If this is taken into consideration, we find that the southern group of counties had only 7.4 fires for every 10,000 inhabitants as against 8.1 in the northern group.



Strafford County, with 4.7 fires per 10,000 population, had the best record in this respect, and Carroll County, with 16.2, the worst. Coos and Grafton counties, on the other hand, ran slightly lower than the average for the southern part of the state. (See Figure 4) The exceptionally high

figure in Carroll County, which includes the bulk of the White Mountains, is in all probability due to the great influx of summer visitors there rather than to the fact that the native inhabitants are more careless than those in the other parts of the state. On the other hand, the figures available do not bear out the assertion sometimes made that in general an industrial population, such as that in parts of southern New Hampshire, is responsible for more fires per capita than the rural population.

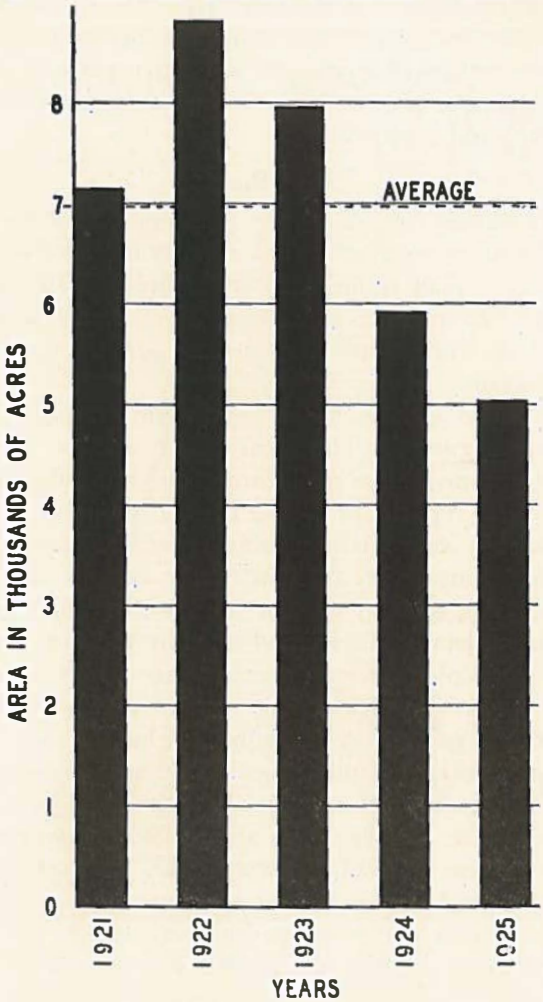
Area Burned

Area burned affords a numerical expression for the so-called "risk of burning" and is a better indicator of the real fire hazard than is the number of fires. It is influenced primarily by weather conditions, the character and condition of the forest, and the efficiency of the fire fighting organization.

The actual area burned is shown for the entire state by years in Figure 5. The areas shown are less than those actually burned, since no information concerning area was given in the reports for 4.4 per cent of the fires. The error due to this cause is undoubtedly small, however, since figures for area were omitted chiefly in the case of the smaller fires, which were not regarded as worth while reporting in detail. This is indicated by the fact that in the case of fires of unknown area the value of timber destroyed per fire was negligible and the cost of suppression per fire was only 25 per cent of that in fires of known area. Taking the figures as they stand, it is evident that the variation from year to year in area burned is about the same as in number of fires. The best year was again 1925 and was exceeded by 76 per cent by 1922, the worst year. It is interesting to note that 1924, which had 29 per cent of the total number of fires during the 5-year period, had only 17 per cent of the area burned, while 1922, which had only 17 per cent of the number of fires, had 25 per cent of the area burned. The difference, of course, arises from the fact that the 1922 fires averaged much larger than the 1924 ones.

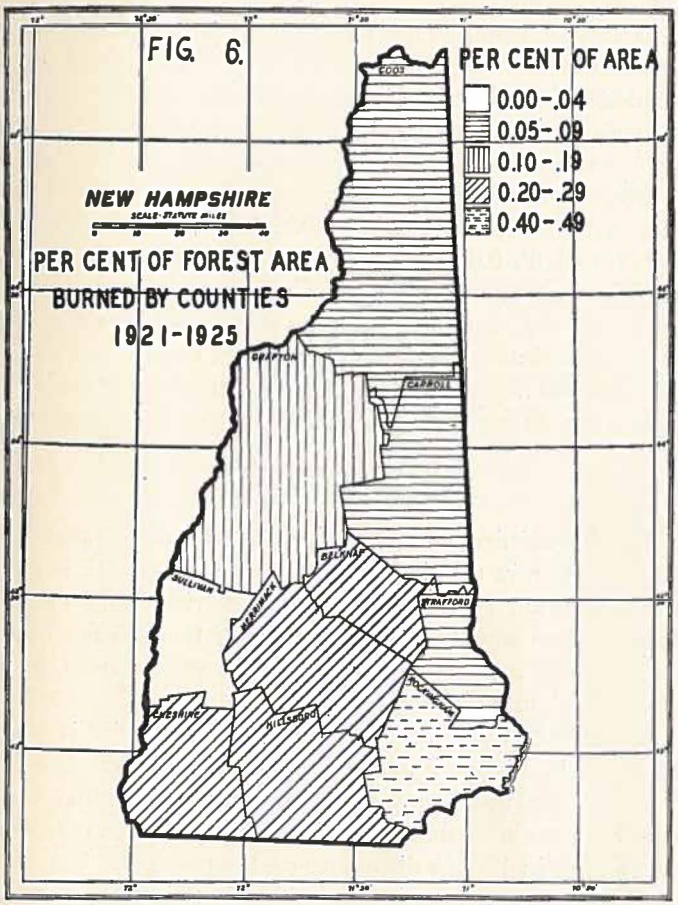
Slightly more than two-thirds of the area burned was in the southern group of counties as against approximately

FIG. 5 TOTAL AREA BURNED 1921–1925



one-third in the northern group. This shows a smaller proportion of total area burned than of total number of fires

and indicates smaller fires in the southern part of the state. Five counties (Grafton, Rockingham, Hillsborough, Merrimack, and Cheshire counties) each had more than 10 per



cent of the area burned in the state, with a total of 78.2 per cent.

For comparative purposes the per cent of forest area burned, (shown in Figure 6), is a more significant figure than the absolute area. This is 0.16 per cent for the state as a whole, which compares very favorably with the 0.10

per cent frequently set up as a reasonable standard toward which fire protective organizations in general should work. It is also encouraging to note that in the worst year (1922) the area burned reached only 0.20 per cent of the total forest area of the state. This would seem to indicate effective action in preventing the occurrence of serious conflagrations.

Judged by this criterion, the northern counties (particularly Coos and Carroll), with an average of 0.10 per cent of forest area burned, show up considerably better than the southern group, with 0.23 per cent. Four counties (Sullivan with 0.04, Coos with 0.05, Carroll with 0.08, and Strafford with 0.09 per cent) have particularly fine records in this respect. Rockingham County, on the other hand, with 0.44 per cent of its forest area burned, has much the worst record as compared not only with the average of 0.16 per cent for the entire state, but even as compared with the next worst county, which is Hillsborough with 0.28 per cent.

Size of Average Fire

Number of fires and area burned are both taken into consideration in the size of the average fire, which is sometimes referred to as an index of the "risk of spreading." It affords an equally good indication of the real fire hazard and perhaps a better indication of the effectiveness of the fire control organization.

The size of the average fire in New Hampshire is shown by years in Figure 7 and by counties in Figures 8 and 9. There is the usual variation as between individual years, running from a minimum of 12 acres in 1924 to a maximum of 31 acres in 1922, a difference of 158 per cent. The average of 21 acres per fire is approximately twice that of the 10 acres per fire sometimes set as the standard toward which control organizations should strive. It is interesting to note that 1924, which had the greatest number of fires, showed the smallest area per fire, while 1922, which had the largest area burned, also showed the largest area per fire.

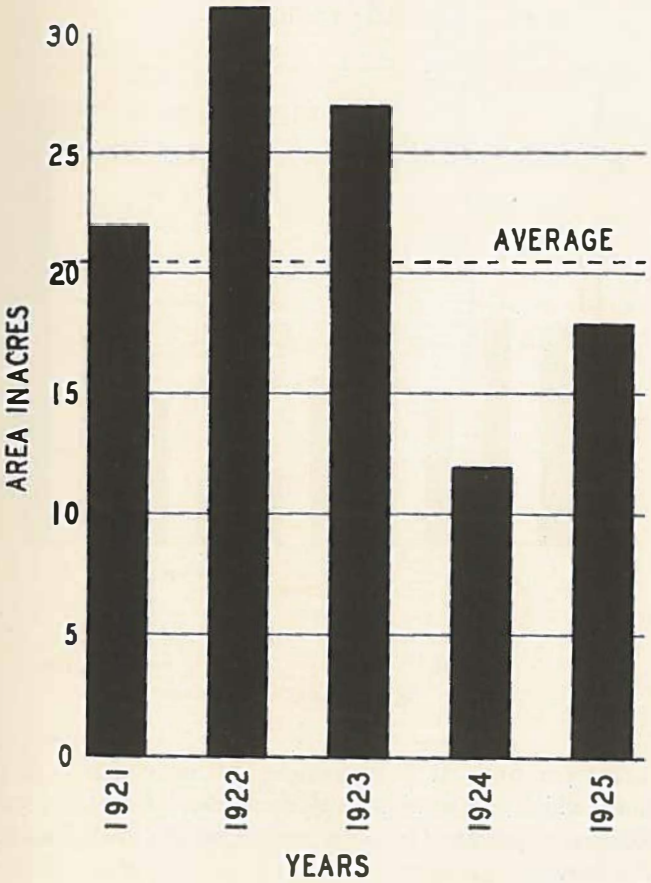
By counties there is a much greater difference in the size

of the average fire than by years. In Grafton County, for example, the average fire (47 acres) was 570 per cent

FIG.7

SIZE OF AVERAGE FIRE BY YEARS

1921-1925



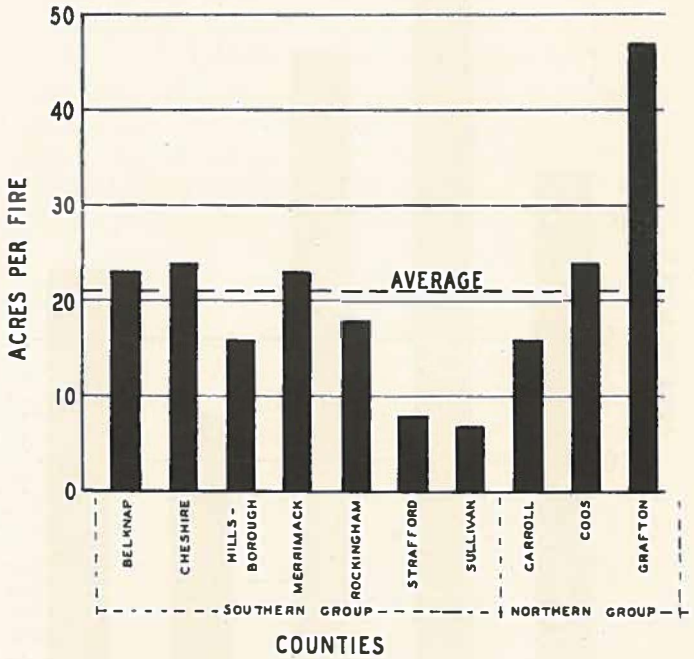
greater than that in Sullivan County (7 acres). Sullivan and Strafford Counties, with average fires of 7 and 8 acres

respectively, had by far the best record in this respect, Hillsborough and Carroll coming next with 16 acres. Grafton County, on the other hand, was far in excess of the next two counties, Coos and Cheshire, each of which averaged

FIG. 8

SIZE OF AVERAGE FIRE BY COUNTIES

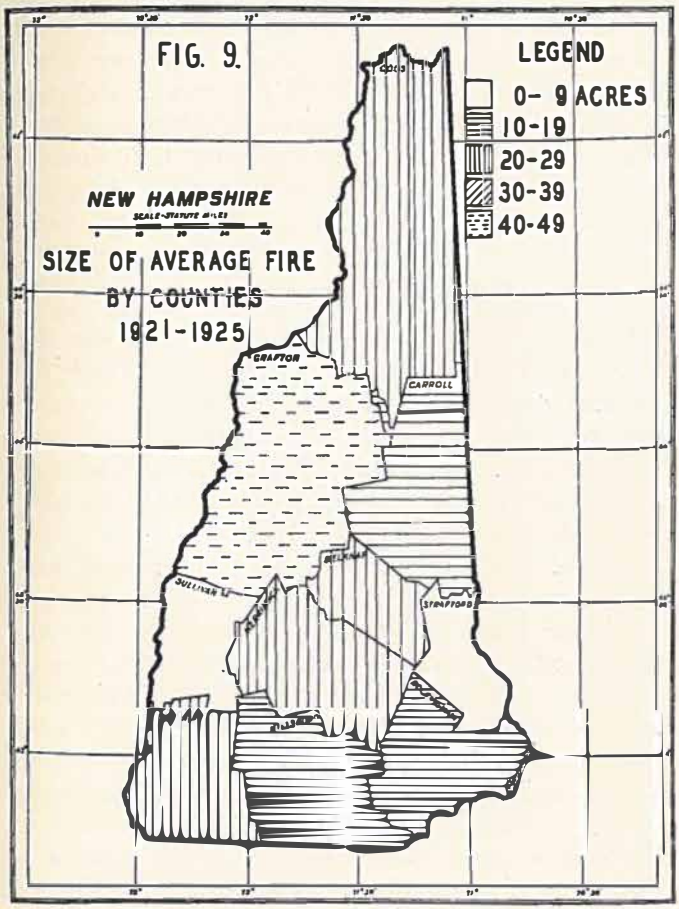
1921–1925



24 acres per fire. It is interesting to note that Carroll County, which ran so high in total number of fires, had the smallest area per fire (16 acres) of any of the three counties in the northern group.

In general, fires averaged much larger in the northern than in the southern group of counties. The average of 31

acres per fire in the northern group was 72 per cent higher than that of 18 acres in the southern group and 48 per cent higher than that of 21 acres for the state as a whole. The



larger size of the fires in the northern part of the state is probably due to the larger areas of continuous forest, the greater amount of cut-over land, the lack of transportation facilities, and the comparative scarcity of population. These factors combine to make the spread of fires easy and their

control difficult. Promptness in reaching every fire with an adequate control force, which is the key to small fires, is hard to achieve in remote regions.

The number of fires over 10 acres in area was fairly constant, varying from 15 per cent of the total number in 1923 to 24 per cent in 1922, with an average of 20 per cent for the 5-year period. This is not a particularly high figure and indicates considerable success in keeping down the number of large fires. It is perhaps particularly significant that in no one of the five years did the number of fires over 10 acres in area go as high as one-fourth of the total number.

Value of Timber Destroyed

The value of standing timber destroyed is the best single index of the "risk of loss" due to forest fires. Other items of destruction, such as damage to soil, pasture, timber cut but not yet removed from the woods, and improvements of all sorts, while often large are, on the whole, of secondary importance and are not included in this bulletin for lack of accurate information concerning them.

The value of standing timber destroyed in New Hampshire is shown by years in Figure 10. The amounts given are, however, much less than the actual value of timber destroyed because no values were reported for 51.2 per cent of the fires. The under-estimate is probably not so great as appears on the surface since the fires of unknown timber value included only 35.2 per cent of the total area burned and must, therefore, have been smaller than the average, presumably with correspondingly small timber values. It should also be borne in mind that the value of timber injured by fires is more difficult to estimate than the area burned and that there is a tendency on the part of most wardens to under-estimate rather than to over-estimate values, particlarly in young growth.

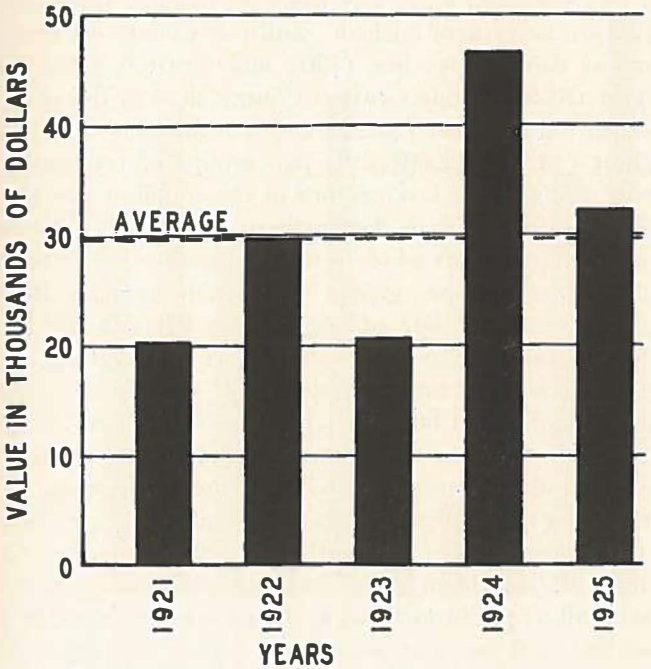
According to the figures available, the average value of timber destroyed per year for the 5-year period was $29,867, with a minimum of $20,433 in 1921 and a maximum of

$46,841 in 1924, a difference of 129 per cent. This is not nearly so wide a range as often occurs in other states, as for example in Maine where the value of timber destroyed in 1921 was 210 times as great as in 1917. The heaviest

FIG. 10

VALUE OF TIMBER DESTROYED BY YEARS

1921–1925



damage occurred in 1924, the year of the largest number of fires, and the next highest in 1925, the year of the smallest number of fires. Loss undoubtedly depends fully as much upon the character of the timber burned as on number, area, or size of fires, and is naturally heaviest in merchantable

stands. The loss per fire varied from a minimum of $62 in 1921 to $115 in 1925.

By counties the greatest loss occurs in the southern group, where it amounts annually to $21,876 as against $7,991 in the northern group. It is a rather striking fact that the southern group, with 46 per cent of the forest area of the state, suffers 73 per cent of the loss. This is probably due to the generally higher stumpage value of white pine, which is the predominant tree in the southern part of the state and usually suffers most severely from fire.

The average damage per fire, shown by counties in Figure 11, was $89. On a per acre basis the damage amounted to $4.28 for every acre burned. Sullivan County showed the smallest damage per fire ($20) and Grafton County the largest ($126); while Grafton County showed the smallest loss per acre burned ($2.69) and Rockingham County the highest ($4.30). Taking the two groups of counties as a whole, the average loss per fire in the southern group was $84 as against $108 in the northern group; while the loss per acre burned was $4.65 in the southern group as against $3.52 in the northern group. These figures serve to emphasize the larger size of the average fire and the lower value of stumpage in the northern part of the state.

If the value of timber destroyed is compared with the total area of forest land, it is found to vary from .18 mills per acre in Sullivan County to 27.96 mills in Rockingham County, with an average of 6.73 for the entire state. The average for the southern group (10.66 mills) is approximately three times that of the northern group of counties (3.35 mills). It is evident from these figures that the average loss on all of the forest land in the state is considerably less than one cent per acre per year. While this figure may seem low it should be borne in mind that forest fires impose a heavy loss on those whose land is burned, even though the state as a whole may not suffer severely.

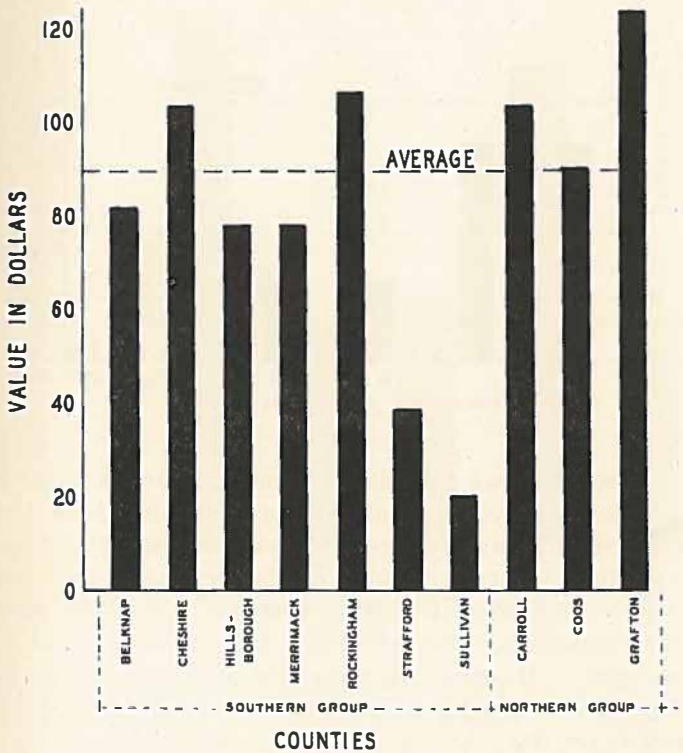
The following comparison of losses in New Hampshire and Maine for the same 5-year period may be of interest in this connection:

VALUE OF TIMBER DESTROYED

	Per fire Dollars	Per acre burned Dollars	Per acre of forest land Mills
New Hampshire	89	4.28	6.73
Maine	722	4.42	10.13

FIG. 11

VALUE OF TIMBER DESTROYED PER FIRE BY COUNTIES 1921–1925



It will be noted that while the value of timber destroyed per fire is much greater in Maine because of the much larger size of the average fire, there is a fairly close cor-

respondence between the loss per acre burned and per acre of forest land in the two states. If the 10-year period from 1916 to 1925 is taken into consideration for Maine the correspondence is still closer, the loss in Maine during these ten years amounting to $4.31 per acre burned and 6.50 mills per acre of forest land.

FIG. 12

NUMBER OE FIRES AND VALUE OF TIMBER DESTROYED BY TIMBER VALUE GROUPS — 1921-1925

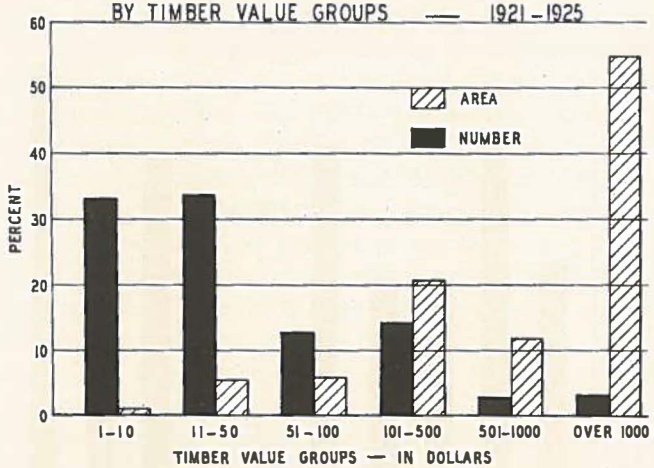


Figure 12 shows the relative number of fires and value of timber destroyed by timber value groups for those fires in which value was reported. It will be noted that while only 6.0 per cent of the total number of fires destroyed timber to the value of $500 or more per fire, these same fires accounted for 66.6 per cent of the total value of timber destroyed. Moreover, 54.8 per cent of the total loss was caused by the few fires destroying timber valued at $1,000 or more per fire. Evidently it pays to prevent large fires.

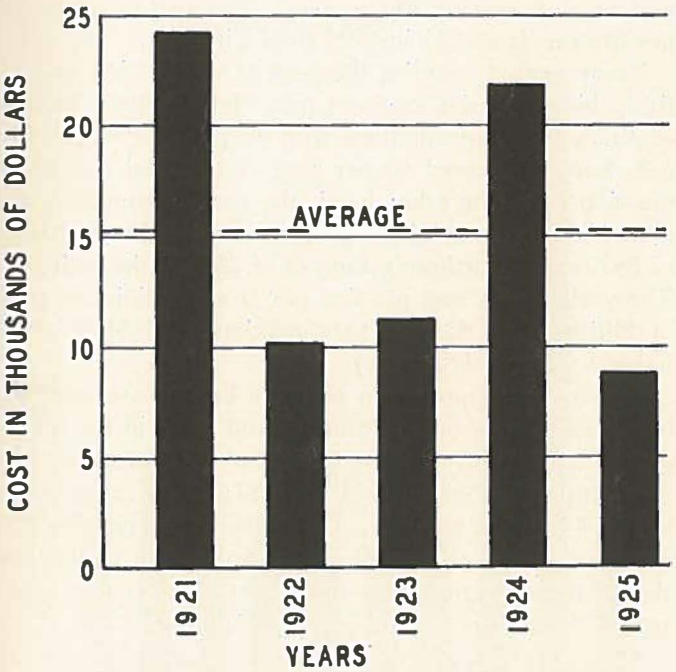
Cost of Fire Suppression

The cost of fire suppression is shown by years in Figure 13. Here again the amounts shown are less than the actual since no costs were reported for 45.6 per cent of the fires.

FIG. 13

COST OF FIRE SUPPRESSION BY YEARS

1921–1925



These fires, however, burned only 16.3 per cent of the total area so that they were considerably smaller than the average, presumably with smaller costs of suppression. The very large per cent of fires for which no figures are given does, however, emphasize strongly the need for more complete reports.

The annual cost of fire suppression varied from $8,776 in 1925 to $24,231 in 1921, with an average for the 5-year period of $15,283. Approximately three-fifths of the total expenditure for fire suppression during the five years came in 1921 and 1924, with only 11 per cent in 1925. It is evident that expenditure for fire suppression does not necessarily vary directly with the number of fires or with the area burned, since 1924, with 45 per cent more fires than 1921, showed 10 per cent less cost of suppression; while 1922, with 25 per cent larger area burned than 1921, showed 57 per cent less cost of suppression. The cost of suppression per fire ran from $31 in 1925 to $73 in 1921.

By groups of counties the cost of suppression was relatively higher in the southern part of the state. Thus, the southern group of counties, with 46 per cent of the forest area burned, showed 60 per cent of the total cost of suppression. On the other hand, the cost of suppression per fire of $35 in the southern group was much lower than that of $83 for the northern group, or of $46 for the entire state. The variation in cost per fire ran from a minimum of $27 in Hillsborough County to a maximum of $134 in Coos County. (See Figure 14.)

The cost of suppression per acre burned averaged $1.94 in the southern group of counties and $2.71 in the northern group, with an average of $2.19 for the state as a whole. By counties this cost varied from $1.29 in Grafton County to $5.54 in Coos County. The higher costs per fire in the northern part of the state are probably due to the larger size of the average fire, to the higher cost per acre burned, and to the greater difficulty of fire fighting.

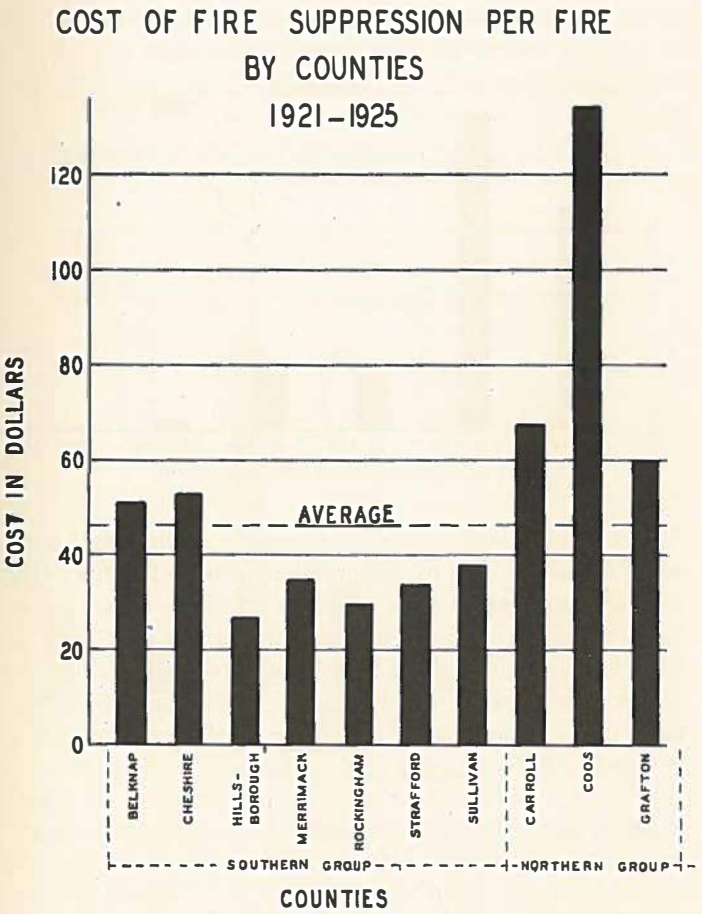
The cost of suppression per acre of forest land averaged 4.45 mills in the southern group of counties as against 2.58 mills in the northern group, with an average of 3.45 mills for the entire state. In other words, the cost of fire fighting on the basis of all the forest land in the state averaged only about one-third of a cent per acre, certainly not an excessive figure.

Comparative figures for Maine and New Hampshire for the same period are as follows:

COST OF FIRE SUPPRESSION

	Per fire Dollars	Per acre burned Dollars	Per acre of forest land Mills
New Hampshire	46	2.19	3.45
Maine	132	.81	1.92

FIG. 14



It is evident that while the cost per fire runs considerably less in New Hampshire, the cost per acre burned and per acre of forest land runs appreciably higher. It may be of interest, though perhaps of no particular significance, to note that in New Hampshire the cost of fire suppression averages approximately one-half the value of the timber destroyed.

FIG. 15

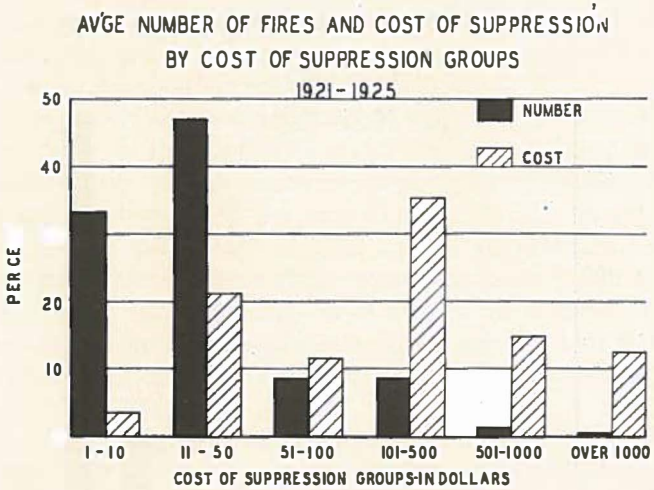


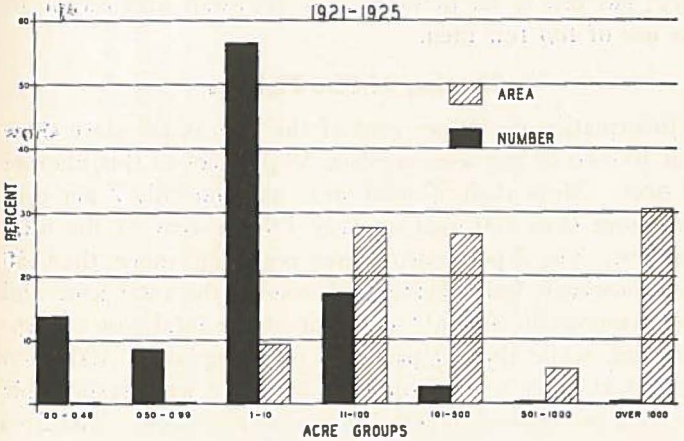
Figure 15 shows the relative number of fires and cost of suppression by cost of suppression groups for fires where cost of suppression was reported. It is a rather striking fact that while only 1.5 per cent of all the fires cost more than $500 per fire, these same fires involved 27.6 per cent of the total cost of suppression. Fires running $100 or more per fire included 10.2 per cent of the total number and 63.4 per cent of the total cost. Obviously the comparatively few large fires are the really expensive ones and must be reduced in number if any material saving is to be made in cost of suppression.

Kind of Forest Burned

Available reports indicate the kind of forest cover burned for approximately 93 per cent of the total number of fires. Of these, 10 per cent were in merchantable timber, 31 per cent in second growth, 27 per cent in cut-over land, and the remainder in two or more kinds of cover and in agricultural land. As would be expected, the value of timber destroyed varied directly with the kind of cover, averaging $11.67 per acre in the case of merchantable timber, $6.11 in second growth, and $2.44 in cut-over land. That there is not a still greater discrepancy between the loss to merchantable timber and to the other classes is probably due to the fact that merchantable timber is frequently not entirely destroyed as a result of fires which do not reach into the crowns.

FIG. 16

PER CENT OF TOTAL NUMBER OF FIRES-AREA BURNED BY AREA GROUPS 1921-1925



Fires by Size Classes

Information as to the number, destructiveness, and cost of fires of known size is given by area groups in Table 5 and Figure 16. Nearly 80 per cent of the fires are less than 10 acres in size and 97 per cent are less than 100 acres.

Nevertheless, the remaining 3 per cent is responsible for 63 per cent of the area burned, 46 per cent of the value of the timber destroyed, and 24 per cent of the cost of suppression. On the other hand, fires of less than one acre are practically negligible in the damage which they do. The relative area burned, timber destroyed, and cost of suppression per fire all rise rapidly with fires over 10 acres in size.

Value of timber destroyed and cost of suppression per fire both increase rapidly with average size. Value and cost per acre, on the other hand, both decrease with increase in average size. It is natural that the cost of fire fighting per acre should be less with the larger fires, but the reason for the decrease in value of timber destroyed per acre is less apparent. Possibly it is due to the tendency to underestimate values where large areas are burned. The higher cost of suppression for the smaller fires may indicate that more men are sometimes used on these than is really necessary; but this is far better than to let small fires escape by the use of too few men.

Number of Fire Fighters

Information on 99 per cent of the fires in the state show that 10 men or less were used on 58 per cent of this number of fires. More than 50 men were used on only 7 per cent and more than 100 men on only 1.9 per cent of the total number. The 7 per cent of fires requiring more than 50 men, however, burned 44.6 per cent of the total area and were responsible for 40.5 per cent of the total cost of suppression, while the 1.9 per cent requiring over 100 men burned 21.2 per cent of the total area and were responsible for 17.2 per cent of the total cost of suppression. The fires requiring less than 10 men, on the other hand, burned only 17.9 per cent of the area and involved only 16.3 of the cost of suppression.

Again it is evident that it is the larger fires which are the most expensive from the standpoint both of area burned and of cost of suppression.

TABLE NO. 5

NUMBER OF FIRES, AREA BURNED, VALUE OF TIMBER DESTROYED, AND COST OF SUPPRESSION PER YEAR BY AREA GROUPS, 1921 TO 1925.

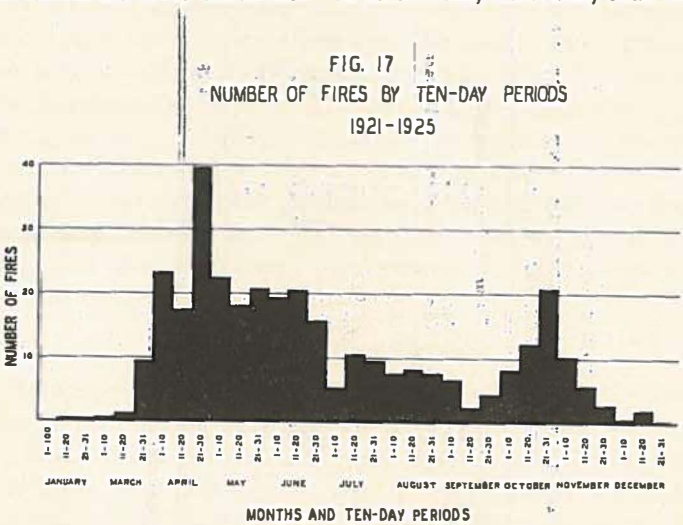
Area Group		Area Burned		Value of Timber Destroyed			Cost of Suppression		
Acres	No. of Fires Per Cent	Per Cent	Per Fire Acres	Per Cent	Per Fire Dollars	Per Acre Dollars	Per Cent	Per Fire Dollars	Per Acre Dollars
0-0.49	13.9	....	....	0.2	1	....	2.6	6	....
.50-.99	8.9	....	....	.4	4	....	2.1	11	....
1-10	56.6	9.2	4	12.9	21	6.06	28.6	24	6.77
11-100	17.4	27.7	35	38.5	210	5.95	42.5	115	3.32
101-500	2.7	26.9	213	32.2	1,091	5.11	15.7	269	1.26
501-1,000	.2	5.7	665	5.3	2,617	3.93	1.5	364	.55
Over 1,000	.3	30.5	2,128	10.5	3,144	1.48	7.0	1,064	.50
Total (Known)	100.0	100.0	22	100.0	93	4.28	100.0	47	2.17
Unknown	4.4*	....	....	**	**	....	1.1*	12	....
Grand Total or Average	....	....	21	....	89	4.28	....	46	2.19

*Per cent of total number of fires and total cost of suppression.
**Negligible.

Season of Occurrence of Fires

Knowledge of the time of year when the most fires occur and the largest area is burned is obviously of prime importance in the handling of fire control activities. Information on these points by 10-day periods is given in Figures 17 and 18, and by months in Figure 19.

During the five years under consideration, January 1 to 10 and the entire month of February were the only periods in which no fires occurred. It is seldom, however, that the



fire danger is serious before March 20 or after November 20. From March 20 on, it ordinarily increases steadily until the ten days from April 21 to 30, after which it drops off, but thereafter remains fairly constant until about the end of June. During July, August, and September the fire hazard is normally at a minimum with a rather marked increase during October and another rather sharp drop off in November. In general, the fire season opens somewhat earlier and closes somewhat later in the southern than in the northern part of the state. This difference is not, however, so marked as in a state like Maine where there is a

FIG. 18

MAXIMUM, AVERAGE, AND MINIMUM NUMBER OF FIRES BY TEN-DAY PERIODS

1921-1925

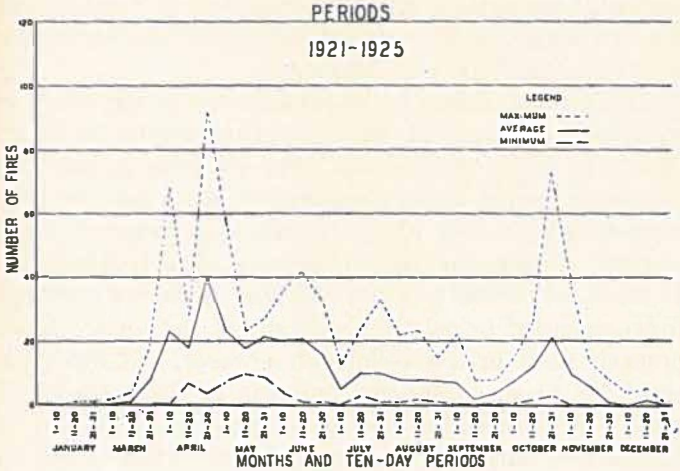
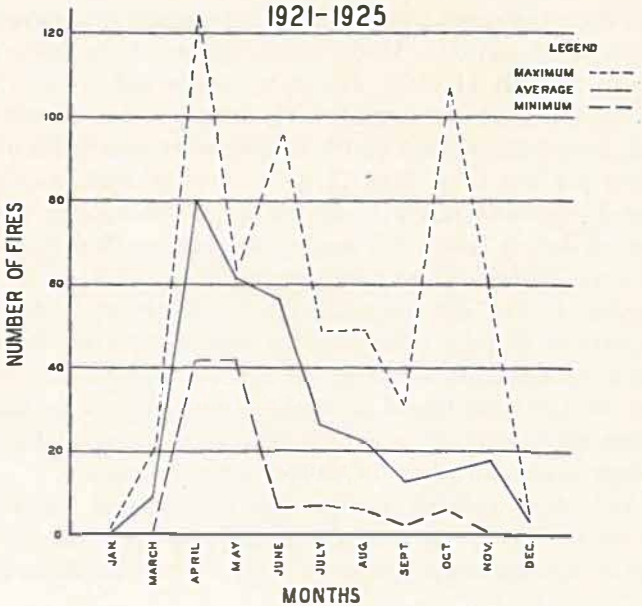


FIG 19

MAXIMUM, AVERAGE, AND MINIMUM NO. FIRES BY MONTHS

1921-1925



considerably greater climatic variation between the northern and southern parts. With the exception of Coos County, the fire danger in New Hampshire apparently varies more with elevation than with latitude.

Area burned, shown by ten-day periods in Figure 20 and by months in Figure 21, does not follow number of fires so closely as might be expected. For example, averages for the 5-year period under consideration show that the maximum area burned by 10-day periods came between July 11 and 20. During this period the area burned amounted to 15.9 per cent of the total for the year, while the number of fires amounted to only 3.2 per cent of the total. This is probably more or less accidental, however, and was apparently due to an exceptional outbreak in 1923, when 5,375 acres were burned over during this period. Ordinarily, the largest area burned is in April and May, when 42 per cent of the total number of fires burned 57 per cent of the total area. In other words, the spring fires are ordinarily larger than those at other times of the year.

This is indicated by the size of the average fire, shown in Figures 22 and 23. With the exception of the abnormal figure for July 11 to 20, due to the single bad fire of 1923, this reaches its maximum of 41 acres per fire during the ten days from April 1 to 10, with another maximum of 40 acres per fire from May 21 to 30. After May, also with the exception of July 11 to 20, there was not a single 10-day period during which the size of the average fire exceeded 18 acres, and during the months of July, August, and September it did not exceed 9 acres. While the disastrous experience of July, 1923, makes it clear that the fire fighting organization must be prepared for the handling of large fires at any time, this is particularly important in the spring when the fire danger is at its height, and to a somewhat less extent in the fall when the danger again increases.

With both number of fires and area burned, variations from the average are perhaps of fully as great significance as the average itself, since the protective organization must

FIG. 20

MAXIMUM, AVERAGE, AND MINIMUM AREA BURNED BY TEN-DAY PERIODS

1921-1925

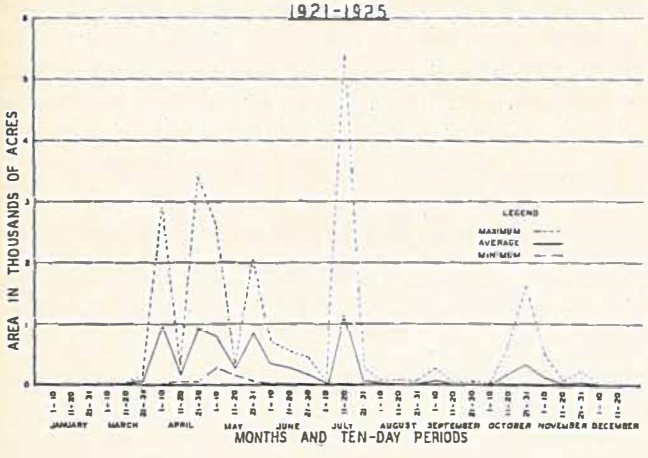
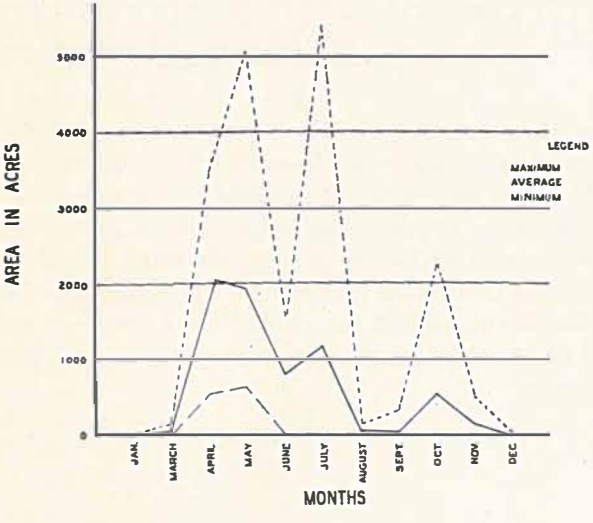


FIG. 21

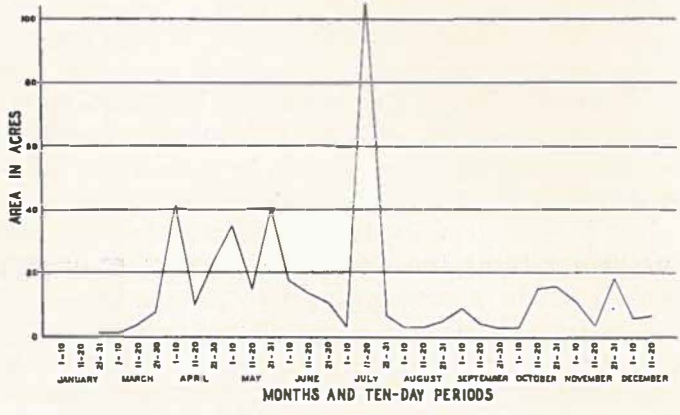
MAXIMUM, AVERAGE, AND MINIMUM AREA BURNED BY MONTHS

1921-1925



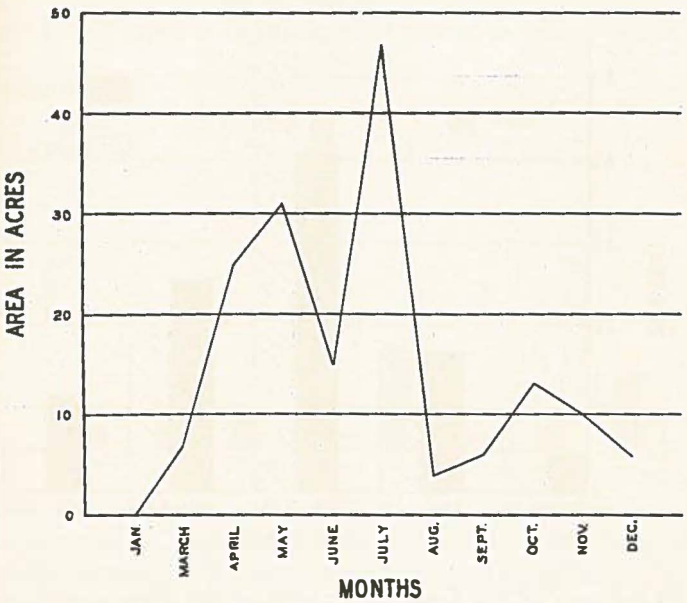
be ready at all times to cope with the maximum danger. It is evident from the figures that, with the possible exception of April and May, the danger from fire during exceptionally favorable seasons may be practically negligible at any time of year. On the other hand, the maximum figures indicate that there is danger of a more or less serious outbreak any time from the last of March until the last of November.

FIG. 22
SIZE OF AVERAGE FIRE BY TEN-DAY PERIODS
1921-1925



During this period September is relatively the safest month. Since unusually hazardous fire conditions can seldom be foretold much in advance, it is evident that the protective force must be so organized as to be ready to cope with any emergency from the beginning until the end of the fire season. In this connection it should be emphasized once more that it is the occasional severe outbreaks, rather than the normal number of fires, that are responsible for the bulk of the damage.

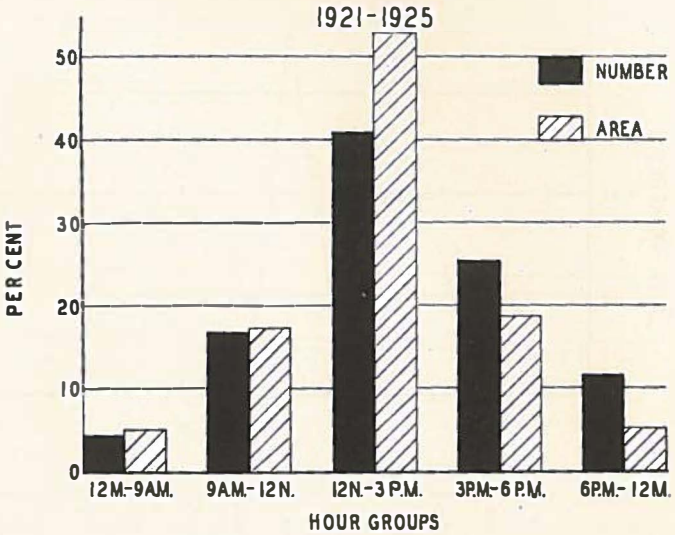
FIG. 23
SIZE OF AVERAGE FIRE BY MONTHS
1921-1925



Hour of Occurrence of Fires

Information as to the number of fires and area burned is given in Figure 24 for the 95 per cent of the total number of fires for which the hour of occurrence was stated in the reports. Most of the fires, as would be expected, occurred between 9 A. M. and 6 P. M. This period, in fact, includes

FIG. 24
NUMBER OF FIRES AND AREA BURNED BY HOUR OF OCCURRENCE
1921-1925



84 per cent of the fires, 90 per cent of the area burned, and 86 per cent of the cost of suppression. For all three items, the worst time of day is between noon and 3 P. M. During this period also the size of the average fire reaches its minimum.

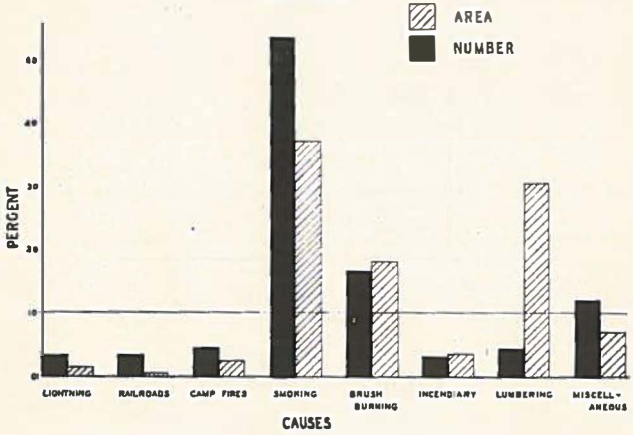
In general, it is clear that the middle of the day, from 9 A. M. to 6 P. M. and particularly the few hours immediately following noon, are the most dangerous from every standpoint. Special precautions should therefore be taken to

control promptly all fires occurring between these hours, when lookout watchmen and other members of the protective force should be particularly vigilant. At the same time, the damage caused by fires occurring at other hours of the day is sufficiently high so that they can by no means be ignored.

Causes of Fires

Knowledge as to the causes of forest fires is the first essential in reducing the number of fires and the damage due

FIG. 25
PER CENT OF NUMBER OF FIRES AND AREA BURNED IN STATE BY CAUSES
1921-1925



to each cause. Information on this point for the fires of known cause (70 per cent of the total) is given in Table 6 and Figures 25, 26, and 27.

For the five years as a whole smoking was the outstanding cause of forest fires and was charged with 54 per cent of the total number. It was remarkably uniform in this respect, with a minimum of 48 per cent in 1922 and a maximum of 62 per cent in 1923. Next to smoking came brush burning ,with 17 per cent of the total, and fires due to miscellaneous causes, with 12 per cent. None of the other causes ran as high as 5 per cent. Fires due to incendiarism

were at the bottom of the list, with 3.1 per cent of the total, followed closely by fires due to lightning and railroads, each of which were charged with 3.2 per cent. A word of explanation is, however, necessary as to the apparently small number of railroad fires. This is due to the fact that rail-

FIG. 26
PER CENT OF NUMBER OF FIRES CAUSED BY SMOKING, RAILROADS, & BRUSH BURNING 1921-1925

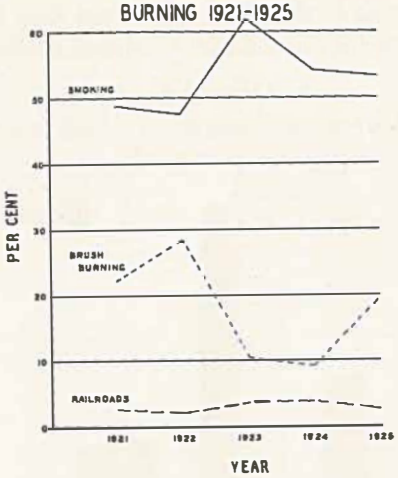
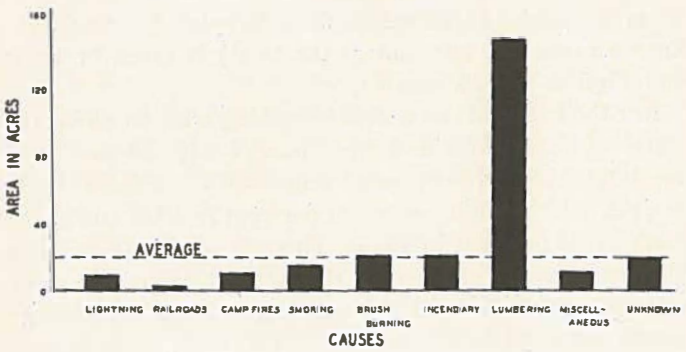


FIG. 27
SIZE OF AVERAGE FIRE BY CAUSES
1921-1925



road fires are not included in reports by fire wardens, on which the present analysis is based, unless special fire fighting crews organized by the warden force are necessary for their control. Since the bulk of the railroad fires are taken care of by the railroad organization itself, the figures used in the present report do not indicate their relative abundance.

The per cent of area burned often differs widely from the per cent of fires due to the same cause. Thus, while smoking causes 54 per cent of the total number of fires, it is responsible for only 37 per cent of the area burned. Lumbering fires, on the other hand, which constitute only 4 per cent of the total number, include 30 per cent of the total area.

These facts are also brought out by figures as to the size of the average fire. Thus, lumbering fires average 148

TABLE NO. 6

NUMBER OF FIRES, AREA BURNED, AND SIZE OF AVERAGE FIRE BY CAUSES, 1921-1925.

Cause	Number of Fires		Area Burned		Size of Average Fire
	Per Year	Per Cent	Acres	Per Cent	Acres
Lightning	7.4	3.2	81	1.3	9
Railroads	7.4	3.2	20	.4	3
Camp Fires	9.8	4.2	111	2.3	11
Smoking	125.2	53.6	1,819	37.1	15
Brush Burning	38.8	16.6	891	18.2	23
Incendiary	7.2	3.1	163	3.3	23
Lumbering	10.0	4.2	1,480	30.3	148
Miscellaneous	27.8	11.9	349	7.1	13
Total (Known)	233.6	100.0	4,901	100.0	21
Unknown	101.4	30.3	2,019	29.2	20
Grand Total or Average	335.0	....	6,920	....	21

acres, while those due to brush burning and incendiarism come next with 33 acres apiece. Presumably these run somewhat above the average for all causes since brush burning is too frequently done during dry spells and in the middle of the day when any burning is dangerous, and since incendiary fires are purposely set at such times and places as to do the maximum damage. Railroad fires are at the

bottom of the list, with 3 acres per fire, and lightning fires next, with 9 acres.

Fires due to the various causes are fairly well distributed as between counties. Thus, in every county in the state, approximately half of the fires are due to smoking. Coos County has the best record in this respect, with a minimum of 42 per cent, while Rockingham County has the worst, with a maximum of 62 per cent. Belknap, Strafford, and Hillsborough counties seem to run somewhat above the average in brush burning, and Cheshire, Grafton, Strafford and Sullivan counties in camp fires. Carroll and Coos counties appear to be most subject to lightning fires, while Merrimack and Hillsborough counties suffer most from incendiarism, and Belknap and Grafton counties from lumbering. Coos County is the only one in the state from which no incendiary fires were reported during the five years under consideration.

The relative hazard from different causes may be indicated roughly by the following tabulation, in which Column 1 indicates the three counties with the largest per cent of fire in the county due to the cause indicated, and Column 2 the three counties with the largest per cent of all the fires in the state due to the cause indicated. Column 1 indicates the counties in which each cause should be attacked from the standpoint of the county as a unit, and Column 2 from the standpoint of the state as a unit. It is significant that in this tabulation Sullivan County occurs only once, Belknap and Carroll Counties only twice, and Cheshire and Strafford Counties only three times.

Cause	Column 1	Column 2
Lightning	Coos	Merrimack
	Carroll	Coos
	Merrimack	Carroll
Railroads	Coos	Coos
	Sullivan	Rockingham
	Strafford	Grafton
Camp Fires	Cheshire	Cheshire
	Grafton	Grafton
	Strafford	Hillsborough
Smoking	Rockingham	Hillsborough
	Cheshire	Rockingham
	Hillsborough	Merrimack
Brush Burning	Strafford	Hillsborough
	Belknap	Rockingham
	Hillsborough	Merrimack
Lumbering	Belknap	Merrimack
	Hillsborough	Grafton
	Merrimack	Rockingham
Incendiary	Merrimack	Hillsborough
	Hillsborough	Merrimack
	Rockingham	Rockingham

Conclusion

In conclusion it should perhaps be repeated that the reliability of the figures presented herein is wholly dependent on the completeness and accuracy of the reports from which they have been derived. While there is no reason to believe that the New Hampshire reports are unduly deficient in these respects, there can be no doubt that there is room for improvement. It is unfortunate, for example, that figures as to cause are lacking for 30 per cent of the total number of fires, as to value of timber destroyed for 51 per cent, and as to cost of suppression for 46 per cent. Furthermore, practically no information is available as to the elapsed time between the start of a fire, its report to the fire warden, the departure of a fire fighting crew, the arrival of the crew at the fire, and its control and final extinction; yet exact knowledge of this sort is of the utmost value in determining how intensively the fire control work must be organized and in checking up on the efficiency of the organization.

It is to be hoped that the new fire report forms now in use will contain more complete and reliable information than has sometimes been the case in the past and will thus give

an increasingly trustworthy picture of the fire situation in the state. The fact cannot be too strongly impressed on fire wardens that the reports they submit are of real value and that the time and effort required to prepare really satisfactory reports are amply justified.

So far as the records for the five years under consideration are concerned, they indicate that the present situation is not one to view with any particular alarm. While the number of fires in relation to forest area and to population appears relatively large, the total number is not excessive. The size of the average fire and the per cent of forest area burned are relatively low, although still considerably higher than the figures ordinarily used as a standard. Disastrous conflagrations are apparently rare, as is evidenced by the comparative uniformity in the number of fires, damage, and cost of suppression as between different years.

The fire hazard is highest in the southern part of the state, which, with 46 per cent of the forest area and 79 per cent of the population, has 78 per cent of the total number of fires. As a result, area burned, value of timber destroyed, and cost of suppression all bulk considerably larger in the southern than in the northern group of counties. On the other hand, the size of the average fire, the loss per fire, and the cost of suppression per fire average considerably higher in the northern group. Smoking is the outstanding cause of forest fires, being responsible for approximately half of the total number in every county in the state.

Education of the general public as to the causes and seriousness of forest fires, strict enforcement of the forest fire laws, and the strengthening of the fire protective organization are probably the chief needs in the state. Specifically, these measures should aim at the reduction of the number of fires in the southern part of the state (particularly in Rockingham County) and of their size in the northern part. With the progress already made New Hampshire has every opportunity to become an outstanding example of a state in which the fire danger is controlled as effectively as is humanly possible.

PUBLIC FORESTS

The Federal Government has acquired 481,453 acres in New Hampshire and 32,892 acres in Maine making 514,345 acres in the White Mountain National Forest. The acreage in New Hampshire is almost 92 per cent of all the lands held by the public, as the state has 5.5 per cent scattered in small units and the towns have 2.5 per cent in town forests.

There are in addition many semi-public forests owned by Societies and Institutions with an area of over 33,000 acres or greater than the acreage held by the state. This list includes the Society for the Protection of New Hampshire Forests, Appalachian Mountain Club, Yale Forest School, Dartmouth College, University of New Hampshire, State Sanitarium, and the New Hampshire Home for Feeble Minded. The Durham Woods belonging to the State University undoubtedly contains the largest and finest stand of primeval forest in New Hampshire. A description of this tract is given later by Prof. Karl W. Woodward.

The amount of forest land held in public ownership is rapidly increasing and this policy seems economically sound. The private individual usually feels that when once a forest crop has been removed, the maturing of the second crop is too long deferred. Taxes and interest with the ever present fire damage to woodlands present a problem and risk which many prefer to avoid. It is the duty, therefore, of the Federal Government, the State and the Towns to raise these crops of timber and plan for their future management. The following pages describe in part how these various forest units are being handled and developed.

Public Forests

White Mountain National Forest	481,453	Acres.
State Forests and Reservations	29,168	"
Municipal and Town Forests	14,276	"
Total	524,897	"

Semi-Public Forests

Society for Protection of N. H. Forests	3,954	Acres.
Appalachian Mountain Club	667	"
Yale Forest School	1,300	"
Dartmouth College Lands	26,300	"
University of New Hampshire	533	"
State Sanitarium	500	"
New Hampshire Home for Feeble Minded	500	"
Total	33,754	"

WHITE MOUNTAIN NATIONAL FOREST

JAMES E. SCOTT, *Forest Supervisor*

The White Mountain National Forest has increased in size from a few thousand acres in 1913, when the Weeks Law was passed, to the present acreage of more than 514,000 acres. This great area has expanded steadily as the purchase program proceeded and its ultimate size will probably be nearly 800,000 acres. There are 32,892 acres of this forest in the state of Maine. The administration of the White Mountain National Forest is intrusted to the Forest Service of the United States Department of Agriculture.

The acquiring of about 23,000 acres in the Waterville Valley during the month of June, 1928, was the high point in the purchase work. For several years many New England associations and private individuals made every effort to induce members of Congress to work for the passage of an appropriation to enable this last stand of primeval spruce

to be brought into public ownership. Hearings before the different Congressional committees were always well attended by an influential and enthusiastic group from the Northeast. In order to leave no doubt in the minds of those who were responsible for approving this purchase a delegation had an unusual opportunity to present the whole proposition in person to President Calvin Coolidge. The President was absolutely in sympathy with this important

OLD GROWTH SPRUCE RESERVED BY FOREST SERVICE ALONG SLOPES OF MT. KANCAMAGUS AND THE SHORES OF LOWER GREELEY POND, IN MAD RIVER NOTCH *Photo by Ayres*

acquisition and directed General Lord to allow for this purchase to be included in the budget. The price paid by the Government for this most valuable tract was approximately $1,000,000.

The White Mountain National Forest has been very fortunate in regard to the number of forest fires. During the past six years there were burned over only 115 acres or an annual average of 19 acres. During that time we have passed through several periods of serious fire weather which

necessitated putting on "the Ban" restricting those who use the woods for business purposes only. It has been estimated that over 700,000 people use the forest for vacation purposes every year and it is hoped that the excellent fire record may be maintained. In order to focus people's attention on the fire hazard all campers are required to secure a camp fire permit (free) from the nearest fire guard, ranger or Forest Supervisor at Laconia, N. H., before building a camp fire within the forest.

The annual cut of stumpage on this National Forest has been steadily increasing. In 1922 the cut for the fiscal year was 2,300,000 board feet valued at $14,321. The cut for the year ending June 30, 1929 is estimated at 16,000,000 board feet valued at over $100,000. Congress has provided that in lieu of taxes which the Government does not pay, 25 per cent of the gross receipts are to be returned to the various towns. In the past year the New Hampshire towns containing Government owned land received over $6,000 on account of this provision. Next year more than four times that sum will be distributed. This means that the hardship many of the towns passed through on account of the Government taking such a large area off the tax rolls, will be largely relieved and the prediction that this condition was temporary, is gradually becoming a reality.

The policy of providing public camp grounds on the Forest is well established. It is only possible to furnish the primary facilities, but special emphasis is placed on securing a pure water supply and in providing necessary sanitary facilities. It has not been possible to do as much as might well be done on account of the limited funds provided for this purpose. The Forest Supervisor had only $750 for this work during the present fiscal year. The fact that over 8000 people camped on Dolly Copp alone during the month of August shows the popularity of the Forest Service Camp Grounds. To accommodate campers on the National Forest, the Forest Service has constructed and maintained six public camp grounds along the main highways. Forest offi-

cers visit the grounds as often as their duties permit and they are ready to assist the public in any way possible. The following is a list of camp sites maintained by the White Mountain National Forest:

Dolly Copp Camp Ground is 6 miles south of Gorham along the Peabody River and just off the Pinkham Notch Highway (Route No. 16).

Glen Ellis Camp Ground is 12 miles from Gorham on the same highway. Parking space is provided at the entrance of the beautiful Glen Ellis Falls.

Zealand Camp Ground lies between Twin Mountain and Fabyan, on the Theodore Roosevelt Highway (Route No. 18) and near the Ammonoosuc river.

Gale River Camp Ground is between Twin Mountain and Profile Notch on the Daniel Webster Highway (Route No. 6).

White Ledge Camp Ground lies just off the main highway from Boston (Route No. 16) close to the beautiful region around Chocorua.

Oliverian Camp Ground is 2 miles north of Glencliff (Route 25) and contains sufficient space for a number of camps.

Special care has been taken to leave the roadsides in good condition along the Pinkham Notch Highway which extends from the Gorham Town line to Libby's land in Green Grant. No unnecessary cutting of line trees was permitted, the shoulders were left smooth and after all work was completed the Forest Service supervised the removal of badly damaged trees and those that were unsightly. This is a work that can be used to advantage along every road built through woodland. Last winter 600 cords of white birch were cut along the Pinkham Notch highway. A screen of from 300 to 400 feet was left uncut and even with the leaves off it was impossible to see where a tree had been removed.

The White Mountain National Forest is protected by several lookout stations which have been maintained since its organization. Close co-operation is carried on by the New Hampshire Forestry Department in the detection and reporting of all forest fires. A stone shelter and observatory of special design was erected during the summer of

1927 on the summit of the Middle Sister peak which is on the north ridge of Mt. Chocorua. The Society for Protection of New Hampshire Forests and the Appalachian Mountain Club assisted by financial gifts for this purpose. This station is well located and covers large acreage of the National Forest as well as private lands. During the past year the State of New Hampshire has turned over to the Forest Service the lookout station on Mt. Osceola at the head of the Waterville Valley and overlooking the recent acquisition and Mt. Pequaket station near North Conway. It has been the policy of the Forest Service to take over all lookout stations within or adjacent to all Federal lands as funds become available. Further co-operation is being undertaken by the construction of lookout facilities on Mt. Hale in the town of Bethlehem. This station will overlook much of the territory formerly covered by Mt. Rosebrook now abandoned and large tracts of federal and private lands. A beginning was made the past summer when the old trail to the top was widened and improved. The steel for the tower which is to be 30 feet in height is already at the base of the mountain and construction will commence early this spring. The other lookout station now maintained by the National Forest is Carter Dome, one of the highest peaks in the mountains and entirely surrounded by federal lands.

For the past six years the White Mountain National Forest has had for its Supervisor, Mr. Ira T. Yarnall, whose headquarters have been in Laconia, N. H. Mr. Yarnall recently has been transferred to the Office of Lands with the Forest Service, Washington, D. C. His numerous friends in the Northeast wish him success in this new work and tendered him a luncheon which was held in Boston, Mass., November 28, 1928. Mr. James E. Scott, his successor, comes to fill the office of Supervisor with a fine record of many years in the Forest Service and undoubtedly will uphold the high standard already set by his predecessors.

STATE FORESTS AND RESERVATIONS

An appropriation of $5,000 a year has been made by the Legislature from 1915 until 1927 for the acquisition of forest land under the direction of the Forestry Commission. The policy of the department has been for the most part to purchase areas recently cut over, but still possessing much valuable young growth. The buying of timber has never been possible because of the small appropriations. Fortunately the department has received some gifts of timber land which form a valuable asset and greatly add to the value of forest lands now held by the state. During this period the average purchase price has been about $5.00 per acre. Many of these lands have been reforested and represent a value of from three to five times the initial cost.

During the last days of the session of the Legislature of 1927 the item of $5,000 for acquisition of state lands was stricken from the final budget. This caused keen regret to many who believed that this policy of state owning forest land and raising future timber supplies was sound and should be continued. To partially offset this loss of appropriation, the Governor and Council approved a transfer of $5,000 from a balance of State Blister Rust funds to be used to acquire forest lands. As a result a total of 2180 acres were purchased. The average price paid was $4.58 per acre. The acquiring of Franconia Notch is listed separately as special funds were made available for this purchase.

The total acreage of state lands as given in the last biennial report was 21,283 acres. There were also 98 acres of reforestation tracts that reverted to the state during the period of 1925-1926 and since that time 50 additional acres. There were acquired by purchase or gift during the last two years 7,624 acres including the Franconia Notch and certain additions of 113 acres due to surveys on the Welton Falls tract and the Pawtuckaway Reservation. The acreage to date is now 29,168 acres acquired as follows:

Previously reported	21,283
Addition by gift or purchase	7,624
Reforestation tracts	148
Corrections in surveys	113
Total	29,168

The following tables show forest lands acquired by the State during the fiscal year July 1, 1926 to June 30, 1927 and all State owned forests and reservations:

STATE FORESTS AND RESERVATIONS ACQUIRED IN 1927 AND 1928.

Name	Location	Date	Acreage	Gift or Purchase	Purchase Cost Per Acre
Poole Tract	Jaffrey	1926	200	Gift	
Cardigan Mt. Addition	Orange	1927	100	$300.00	$3.00
Honey Brook Addition	Marlow & Lempster	1927	315	$1700.00	$5.40
Dodge Brook Addition	Lempster	1927	153	$400.00	$2.61
Merrimack River	Boscawen	1927	151	$1780.00	$11.85
Hubbard Hill	Charlestown	1927	680	$2800.00	$4.12
Connecticut River	Charlestown	1927	225	$1000.00	$4.44
Belknap Mountain	Gilford	1927	556	$2000.00	$3.60
		Purchase	2180	$9980.00	$4.58 Average
		Gift	200		price per acre.
		Total	2380		

BY SPECIAL APPROPRIATIONS

Franconia Notch	Franconia & Lincoln	1928	5244	$200,000.00	

Franconia Notch

"THE GREAT STONE FACE"
Franconia Notch State Forest Reservation
Photo by Atkinson News Co.

Franconia Notch has long been famed for its "Old Man of the Mountain." The "Great Stone Face" high up on Profile or Cannon Mountain is the greatest phenomenon in New Hampshire. Ever since its discovery over one hundred years ago this whole region has been the mecca for summer tourists. Other scenic features such as the Flume, Pool, Basin, Profile and Echo Lakes greatly enhance the beauties of this Notch which has become widely known.

This valuable property has been managed by several persons of note ever since 1850 when the first accommodations were provided for the public. Mr. Richard Taft of Barre, Vermont, was manager of the first Profile and Flume hotels and in 1866 Col. Charles H. Greenleaf became a partner in this enterprise. After the death of Mr. Taft in 1881 and until 1922, Colonel Greenleaf was the head of the corporation. The original Lafayette House, a small tavern, for many years catered to the tourists until it was moved to the rear of the recent Profile Hotel where it served other purposes. The Flume House located near the entrance to the Flume was one of the famous hotels of the White Mountain region until it burned in 1871. The new Flume house rebuilt on the same spot was a favorite attraction to

the travelling public until it likewise succumbed to fire in 1918. The first Profile house at the northerly end of the Notch was built and opened to the public in 1853. Improvements to these properties were made from time to time, additional lands were acquired until over six thousand acres mostly of forests belonged to Colonel Greenleaf. In 1906 the new Profile House together with many cottages was opened to the public and at that time considered the largest and finest hotel in the White Mountain region. Frank H. Abbott & Son acquired this property in 1922 and the next summer this famous establishment with most of the outlying buildings was burned to the ground. The destruction of this property was indeed a great loss not only to the owner, but to the village of Franconia and the state. Hundreds of visitors who had made this hotel their headquarters during the summer season, were now forced to locate elsewhere as the owners decided not to rebuild.

After the state had purchased Crawford Notch in 1911 there was some public agitation for acquiring Franconia Notch likewise. This popular demand of the public for state ownership of Franconia Notch was renewed when the fashionable Profile house was destroyed in 1923. The Society for Protection of New Hampshire Forests was the first to advocate the acquisition of this property. Its officers were convinced that the time had arrived for immediate public action. Early in the session of the Legislature of 1925 the Society introduced a bill providing for the acquisition of the Profile and as much of the Notch as possible and calling for an appropriation of $200,000 for this purpose. An act was finally passed by the Legislature and signed by Governor John G. Winant. Negotiations were soon opened for the purchase of this tract. Governor Winant and Council held several sessions with the owners but purchase of the property was not possible due to lack of funds. The situation remained unchanged until the administration of Governor Huntley N. Spaulding. Governor Spaulding and the President of the Society fin-

ally obtained an option on all the land owned by the Abbotts in Lincoln and Franconia except the Profile Golf Links for $400,000. Previous to this time, a memorandum in the will of the late James J. Storrow, directed his heirs to make available the sum of $100,000 for the purchase of lands in the White Mountains. With the approval of the heirs this entire amount was applied to the acquisition of the Notch.

The Society for Protection of New Hampshire Forests under the able leadership of Philip W. Ayres offered to raise the balance of the fund of $400,000. The campaign to save the "Old Man of the Mountain" was broadcasted through the press during the winter of 1928 and many organizations began their drive to raise their respective quotas. The Women's Clubs of New Hampshire responded nobly in this effort and finally raised over $65,000 of the total amount. The Granges, Kiwanis and Rotary Clubs, Izaak Walton League, Chambers of Commerce, School children; in all more than 15,000 persons assisted in this work. By the first of March the fund had been raised and the purchase of the whole Notch assured.

Meanwhile the New Hampshire Forestry Commission had many sessions with Governor Spaulding and the officers of the Society to decide upon the future management of this large and valuable tract of forest land. Many ideas were advanced as to the future improvements of the property and it was unanimously decided that Mr. Arthur A. Shurtleff, landscape architect of Boston, Massachusetts, should consider the whole purchase as a unit in any improvements to be made. A temporary division of the tract was finally decided upon as the best method of management and it was agreed that the state should take title to five thousand acres of land on the north comprising the Basin, the Old Man of the Mountain, Profile and Echo Lakes. The Society agreed to accept title to the balance of the tract of almost 1000 acres including the Pool and the famous Flume for a period of twenty years after which it becomes the property of the state. Prior agreements gave the Abbotts the rights to

ECHO LAKE, FRANCONIA NOTCH
Photo by Slade

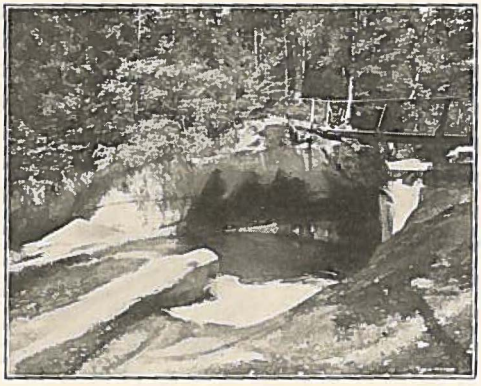
maintain and operate the Flume and Pool until November 1, 1929. The several leases were prepared and drawn up by the Attorney General who decided that condemnation proceedings should be used to give the state the best title. These papers were returned from the Court August first, the actual date the state came into full possession of this valuable property.

The first real work of improving the Notch began June 15 when a planting crew commenced reforesting the slopes and banks directly in the rear of the old hotel. About six thousand trees were set out on these grounds. The Forestry Commission, the officers of the Society and Mr. Shurtleff spent considerable time deciding the immediate improvements for the summer. The Profile boat house was taken down leaving only part of the floor as a platform, an old garage was moved into the woods and two spring houses demolished. Two of the buildings which escaped the big fire were painted. The old Boston & Maine Railroad station which had been used as a laundry by the Hotel Company was changed over to provide quarters for the work crew. Two metal shacks, the old chimney on the power house and other debris left from the fire were hauled away and buried in the woods. About fifteen men were employed during the summer months on all kinds of work. A team and a truck were hired to do the clearing up in certain parts of the woods and the hauling of materials about the reservation.

Many improvements were made at the northerly end of the Notch about Echo Lake. The recent cutting of spruce

by former owners resulted in piles of slash left too near the highway for safety. Many days of hard labor were spent by a crew of men carrying this brush to the gravel pit where it was burned. The Highway Department crew co-operated by constructing a rustic fence across the gravel pit; by abandoning part of this pit and in widening the road near the lake. Many minor improvements were carried on in this vicinity.

Attention was given to improve the appearance of the Profile Outlook. The entrances were clearly defined with gravel walks laid out to the souvenir store. The sanitary conditons were greatly improved. The parking areas were widened and definitely outlined. The trail about Profile Lake was cleared and all foot bridges rebuilt. At the close of the season the Profile store was moved across the roadway near the upper end of the parking area. This change in location will permit an unobstructed view of the "Old Man"; yet will enable all those who wish to purchase souvenirs or post cards to do so. The trail leading to the Clearing was brushed out and several foot bridges renewed.



THE BASIN, Franconia Notch State Forest
Courtesy F. H. Abbott & Son

The views from the open meadow called the "Clearing" midway between the Flume and the Profile are the finest in the Notch. From this spot can be seen the whole Franconia range, Eagle Cliff, Cannon Mountain with its steep rocky slopes and Mt. Pemigewassett. Campers usually select the Clearing to spend the night or make their visit last for several days

while they climb to Lonesome Lake or seek the heights of Mt. Liberty. Several days' work were required to fill in a deep trench made by the overflowing of a small brook during the flood of November, 1927. This same brook also deposited tons of stone and gravel nearby which made an unsightly appearance. Many large crooked hardwoods along the highway were cut to permit a greater and more extended view of the mountains. A new foot bridge was built across the Pemigewasset river, connecting the trail from the highway to Lonesome Lake or the Profile.

One bridge was built near the Basin, another at the Baby Flume. A new short trail was made to the "Pot Holes" where tourists stopped to examine the peculiar rock formation or to watch the babbling brook.

A beginning was made at White House Bridge Camp Ground to cut the alders and bushes and improve the appearance of the place. A rustic fence was constructed near the highway which permits better protection for cars parked within the camp ground.

The Forestry Commission decided that the dedication of the Notch should be held Saturday afternoon, September 15th. A large boulder was located near the old Hotel site and moved to the shore of Profile Lake by the Highway Department crew. A bronze tablet with suitable wording was made and bolted to the rock. Nearby a rustic summer house was constructed and the exercises were conducted from this pavilion. The day of the dedication was cold and windy and undoubtedly affected the attendance. All cars except those carrying invited guests were parked at the old hotel site. The 172nd Infantry Band of Manchester, N. H., made the trip to the Notch by bus and gave a concert before and after the exercises. The speakers were W. R. Brown, chairman of the N. H. Forestry Commission, former Governor John G. Winant, Allen Hollis, President of the Society, Mrs. George A. Morris, President of the N. H. Women's Clubs, Governor Huntley N. Spaulding, who unveiled the tablet, and Judges James W. Remick, who gave

the oration. This program was followed by a flag salute and bugle calls by the Littleton Post of the American Legion and a pageant on the shores of the Lake by children from Littleton schools under the direction of Miss Frances A. Johnson.

Later in the fall about thirty cords of pulpwood and twenty-five thousand feet of spruce logs were salvaged from the woods north of Echo Lake and yarded near the top of Three Mile Hill. The pulp was sold to Parker & Young at Lincoln and the logs to parties in Franconia. Although little profit was made in this undertaking, the work

MEMORIAL TABLET, Profile Lake, Franconia Notch
Photo by Shorey Studio

was well worth while as this timber had all been blown down and presented a dangerous fire hazard.

The Forestry Commission, with the aid of the Society, is in process of making further improvements to the highways, trails, and camp sites in Franconia Notch. Only a beginning has been made this first season.

Poole Gift

Monadnock is the outstanding mountain in southwestern New Hampshire and over three thousand acres are now in public ownership. Many trails traverse the slopes and

sides of this mountain and it is now becoming one of the most frequented haunts of the tourist in this section. The late Joel H. Poole of Jaffrey gave to the state over 500 acres to establish a park and reservation. In the spring of 1927 his widow, Mrs. Elizabeth S. Poole and daughter Mrs. Alice W. Poole, made a gift to the state of 200 acres adjacent to and on the north of the state land. This tract will materially add to lands now held by the public.

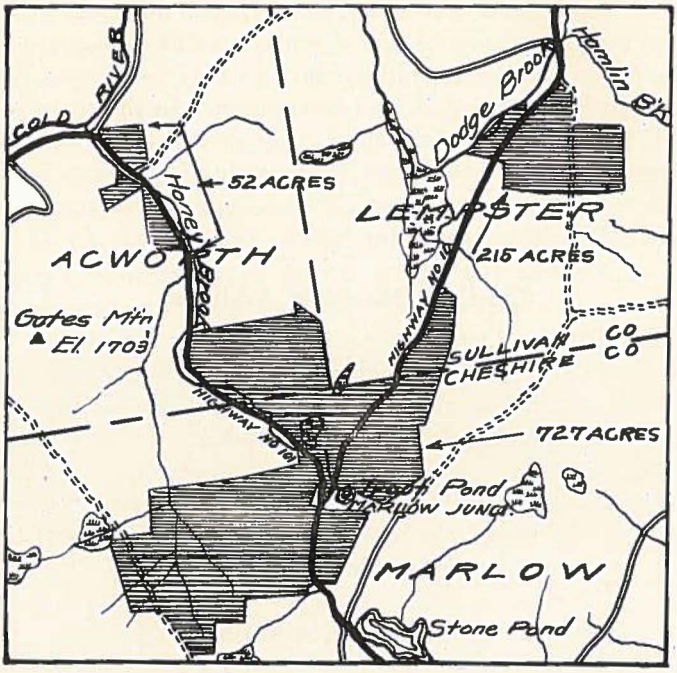
Cardigan Mountain Additions

Two fifty-acre lots were purchased during the summer of 1927 on the westerly slopes of Cardigan Mountain and adjacent to land now owned by the state. One lot was acquired from Walter Dimond and the other from Miss Mary Brock both of Orange, N. H. The average price was $3.00 per acre. These additions straighten out the boundaries on the westerly side of the reservation and include parts of the trail and telephone right of way to the summit.

Honey Brook Additions

This reservation lies in the towns of Lempster, Marlow and Acworth and is on both sides of the Dartmouth College Highway. From a small tract of 75 acres acquired in 1918 consisting of the Fritz Amster farm, the acreage has increased to 779 acres. Two additions were made during 1927. The first of 254 acres, being the old Lewis D. Gumb farm, was acquired from the Union Trust Bank of Lowell, Massachusetts, which held the title. This lot lies to the east of land owned by the state and is intersected by the old county road from Acworth to Marlow. Much valuable young growing pine was found on this farm and materially increases the value of the reservation. Some of the open land has been planted to white pine. The average price paid per acre was $4.00.

The other addition lies on the Dartmouth College Highway and on the north side of the old Fritz Amster farm. This tract of 61 acres was purchased from Walter A. Kirk

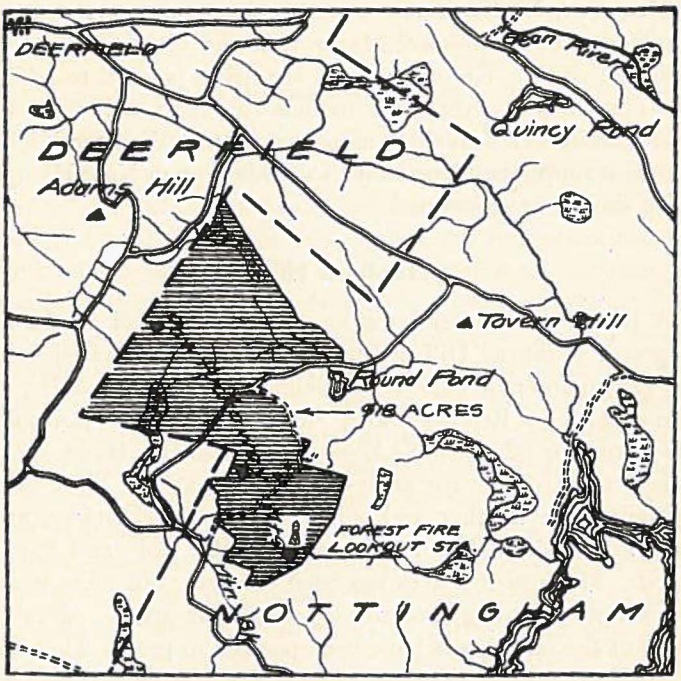


HONEY AND DODGE BROOK STATE FORESTS,
Acworth, Lempster and Marlow

of Keene, N. H., for $500. Part of this lot is in the town of Lempster. Valuable hardwoods and scattered young pine growth cover this tract.

Dodge Brook Additions

One hundred and fifty-three acres were purchased from H. A. Hatch of Bellows Falls, Vermont for $400 or at a price of $2.61 per acre. This tract lies on both sides of an old road to Marlow and adjacent to land acquired in 1918. Years ago this was a prosperous farm with orchards and open pastures. Gradually the old pastures seeded in to pine and hardwoods which were partially cut off in 1925. The old farm buildings now abandoned have little value, but a dense stand of young growing pine was left on the easterly side of the lot and forms the nucleus of a valuable future



PAWTUCKAWAY STATE FOREST, Nottingham

forest. Some of the open areas will be planted at the earliest opportunity. The old family cemetery near the farm house indicates the many generations who made a living on some of these farms.

Merrimack River

The Forestry Department had an opportunity to acquire 151 acres of open and cut over land lying between the Daniel Webster Highway and the Merrimack river in the town of Boscawen. This tract was formerly part of an old farm and the owners were anxious to sell the land easterly of the highway. Mrs. Clara F. Payne of Providence, Rhode Island, was paid $890.00 for her interest; Major Rodd of Concord, N. H., $160.00; the town of Boscawen $75.00 and the Franklin Savings Bank, $655.00. Arthur J. Boutwell

of Concord, N. H., kindly gave a release of any rights in the land. The Boston & Maine Railroad crosses the tract near the river. The open areas are being planted to white pine and it is expected that in time this tract will show to the thousands of travellers along the Daniel Webster Highway that more abandoned farms of this type in New Hampshire should be reforested.

Hubbard Hill

A tract of 680 acres lying on the westerly and southerly slopes of Hubbard Hill in Charlestown was purchased during the summer of 1927 from George E. Bowen and H. A. Hatch both of Bellows Falls, Vermont. Mr. Bowen sold 463 acres for $2000 or $4.17 per acre and Mr. Hatch gave a deed to 217 acres for $800 or $3.64 per acre. These lots adjoining one another and being partly on a roadway, are very accessible and contain some valuable soft and hardwood. Much of this area has been cut over; but there were left stands of young growth too small for use. Already some of the open areas have been planted to pine. There is a fine opportunity for improvement work to be carried out on the Hubbard Hill tract. Old chestnut now dead should be salvaged if possible; white birch is plentiful and should be marked for cutting as well as some white ash and hemlock. The log roads traversing these lots should be cleared making desirable fire lanes and easy access to the interior.

Connecticut River

A tract of 225 acres just south of the village of Charlestown was purchased from H. A. Hatch of Bellows Falls for $4.25 per acre. The area has valuable stands of young growth and much standing cordwood. The latter should be marked for cutting as the markets for this product should be excellent with the village of Charlestown only one-half mile away and Bellows Falls, Vermont, about seven miles distant. This tract has future recreational values as it

commands exceptional views of the Connecticut river both north and south.

Belknap Mountain

The Forestry Department in 1914 built a lookout tower on the summit of Belknap Mountain to protect a large section of the state about Lake Winnepesaukee and areas south of it. Leon E. Morrill who owned the mountain and the farm at the base gave the state permission to maintain the station and for several years was the regular watchman. In 1926 negotiations were completed with Mr. Morrill to sell the mountain reserving for his own use the farm and pastures. Work was progressing on the title and transfer when Mr. Morrill was taken seriously ill and later transferred to the State Hospital at Concord. Judge Frank P. Tilton of Laconia was appointed by the Court to care for Mr. Morrill's affairs and progress was being made by the state to acquire this property. During the winter of 1927 Mr. Morrill died and further delays were necessary to settle his estate. John A. Hammond of Gilford was finally appointed administrator and after several months of clearing up legal difficulties, the title was passed. This large tract of 556 acres was acquired for $2000 or $3.60 per acre. Visitors to this mountain usually number over 2000 yearly. The views from the summit are unsurpassed in the state. All of the important peaks from Mt. Washington on the north to Mt. Monadnock in the southwestern part of the state can be seen. Additional trails and better ones could be made on this mountain which should become as popular as Monadnock.

Gift of Timber on Welton Falls Tract

All the timber and young growth on the Patten lot of the Welton Falls tract was reserved by the grantor when this lot was acquired by the state in 1923. Last winter there was an opportunity to purchase this timber at a very reasonable price. Although the department had no funds

available, Miss Caroline A. Fox of Arlington, Massachusetts, was willing that the state should take $250 from her forestry fund which she had already made for certain purposes. A deed covering the stumpage on this lot was accordingly made and this valuable timber is now owned by the state.

TOTAL STATE FORESTS AND RESERVATIONS

No.	Name	Location	Date Acquired	Acres	
1	Miller Park	Peterboro	1891	3	Gift
2	Cathedral and White Horse Ledge	Conway	1901	118	Gift
3	Monadnock	Jaffrey	1915	493	Gift
4	Haven	Jaffrey	1908	95	Gift
5	Harriman-Chandler	Warner	1911	405	Gift
6	Crawford Notch	Hart's Location	1913	5,925	
7	Merriman	Bartlett	1913	530	Gift
8	State Nursery	Boscawen	1914	257	
9	Huckins	Ossipee	1914	100	Gift
10	Everett	Dunbarton	1915	56	
11	Walker	Concord	1915	47	Gift
12	Davisville	Warner	1915	32	
13	Alton Bay	Alton	1915	209	
14	Mast Yard	Hopkinton and Concord	1915-1920	400	
15	Sentinel Mountain	Piermont	1915	143	
16	Livermore Falls	Campton	1916	134	
17	Blue Job	Farmington	1916	99	
18	Mascoma	Canaan	1916	174	
19	Litchfield	Litchfield	1916	122	
20	Salmon Falls	Rochester	1916	20	
21	Bear Brook	Allenstown	1916	413	
22	Sugar Hill	Bristol	1917	57	Gift
23	Kearsarge	Wilmot	1917 & 1919	839	
24	Jeremy Hill	Pelham	1917 & 1918	63	
25	Cardigan Mountain	Orange and Alexandria	1918-1924	2,700	
26	Honey Brook	Marlow and Acworth	1918-1921	779	
27	Stoddard	Stoddard	1918	71	
28	Dodge Brook	Lempster	1919	215	
29	Black Mountain	Haverhill	1919 & 1920	383	
30	Scribner-Fellows	Ashland	1918	140	Gift
31	Contoocook	Hopkinton	1920	30	
32	Nottingham	Nottingham	1920	16	
33	Ponemah	Amherst	1920	63	
34	Craney Hill	Henniker	1920	31	
35	Taylor	Concord	1920	7	Gift
36	Pillsbury	Washington	1920-1924	3,085	Gift
37	Marshall	New Ipswich	1921	20	Gift
38	Conway Common Lands	Conway	1916-1922	769	Gift
39	Beech	Keene	1921	21	Escheat
40	Fox	Hillsboro	1922	328	Gift
41	Annett	Sharon and Rindge	1922 & 1923	1,092	Gift
42	Green Mountain	Effingham	1922	15	
43	Glover	Pembroke	1922	7	Escheat
44	Welton Falls	Alexandria	1923	240	Gift
45	Pawtuckaway	Nottingham	1923 & 1924	918	
46	Blair	Campton	1924	112	
47	Red Stone	Conway	1924	43	
48	Grant	Fitzwilliam	1925	6	Gift
49	Pitcher	Stoddard	1925	5	Gift
50	Baker	Quincy	1925	5	Gift
51	Russell	Greenville	1925	25	
52	Stevens	Nottingham	1925	4	Gift
53	Leighton	Dublin	1925	25	
54	Sawyer	Jaffrey	1926	80	Gift
55	Soucook	Loudon	1926	50	
56	Hodgman	Amherst	1926	18	
57	Allen	Concord	1926	25	
58	Carroll	Warner	1926	25	
59	Kimball	Mason	1927	25	
60	Poole	Jaffrey	1927	200	Gift
61	Merrimack River	Boscawen	1927	151	
62	Hubbard Hill	Charlestown	1927	680	
63	Connecticut River	Charlestown	1927	225	
64	Belknap	Gilford	1928	556	
65	Franconia Notch	Franconia and Lincoln	1928	5,244	
				29,168	

Improvements on State Lands

It has been customary for the department to make certain improvements to the state lands from time to time as funds permit. Improvements include the surveying of boundaries, marking of corners, cutting of hardwoods from pine stands and the clearing of roadsides. Arrangements were made with Prof. Karl W. Woodward of the University of New Hampshire to use some forestry students during the spring vacations on surveys and timber estimates on the Pawtuckaway reservations. Much valuable information was obtained and later used to acquire certain timber growth adjacent to the big boulders. For six weeks during the summer of 1927 a vacation camp was established on the Cardigan Mountain tract and 10 forestry students were given instructions in surveying, type mapping and timber estimating. The department co-operated in this work by furnishing board and lodging. About one-third of the work has been completed and it is hoped that other summer camps may be established on this tract.

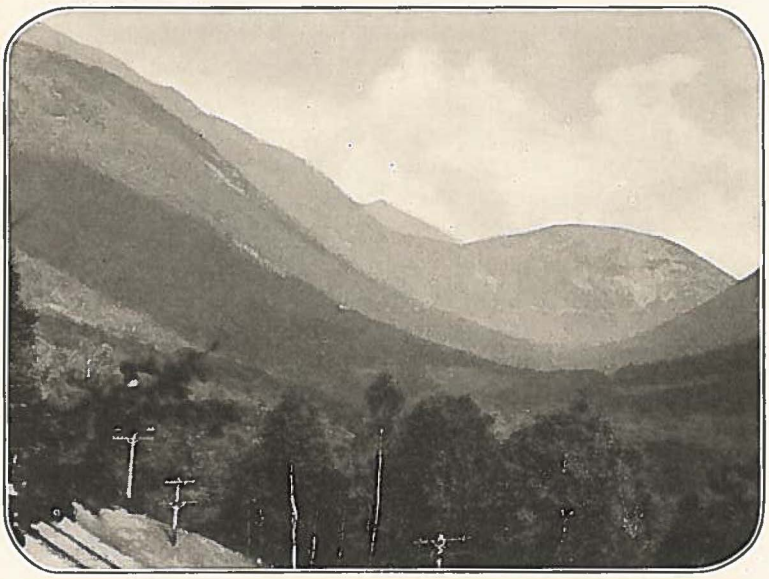
During the winter of 1920 arrangements were made for the blister rust inspectors to examine and map certain state tracts. The boundaries and corners of fifteen tracts were surveyed and marked; of this number seven lots were subdivided into forest types. The complete maps were made in the Concord office. The following state forests were surveyed and type mapped; Hubbard Hill (also detailed timber estimate made) Connecticut River, Alton Bay, Huckins, Belknap Mountain, Mast Yard, Harriman and Everett. A summary of the work totals 42 miles surveyed and 2,046 acres examined and typed.

Several days were spent in a growth study of white pine stands near Concord. Measurements were made of tree heights, ring counts on the stump and borings at breast height. One hundred and twenty-one trees were measured, the ages varying from 30 to 100 years. The greatest growth was 6.3 per cent for young pines to 1.1 per cent for older stands. The average for all trees studied was 2.5 per cent.

Further study on tree growth should be made and other species beside white pine included, but at present funds are lacking to carry on this interesting investigation.

Crawford Notch Improvements

New Hampshire suffered much from the disastrous effects of the November, 1927, flood. The road through Crawford Notch was completely washed away in places and made im-



CRAWFORD NOTCH FROM RIPLEY FALLS TRAIL

passable for the winter months. Much rain had fallen during the months of September and October. The ground was completely saturated. At the Willey House camps it began to rain early Thursday, November 3rd. The few camp attendants who had remained to finish the season's work began to realize that the storm was very severe. The wind drove the rain in sheets against the steep sides of Willey and Webster. Early in the morning the restless sleepers in their camps were awakened by the trembling of the ground and the roar of a landslide. Fearful lest old

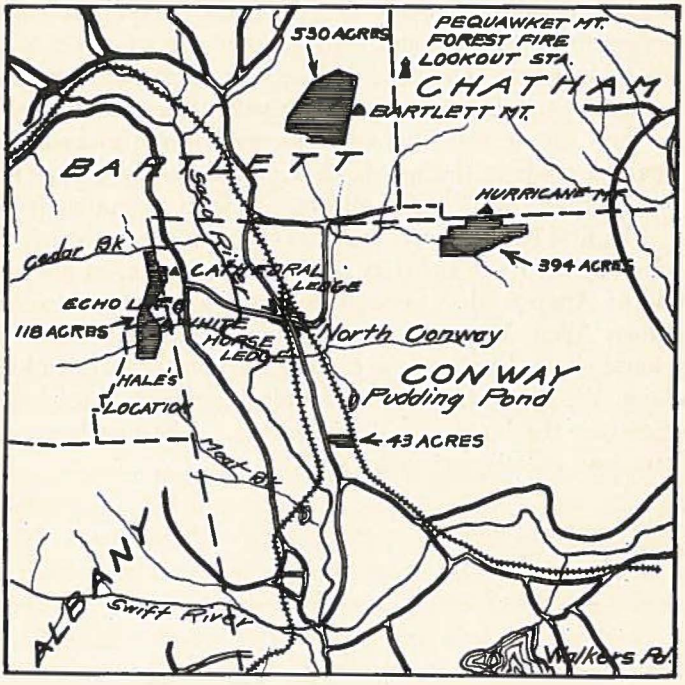
Mt. Willey should again send tons of earth to the valley below as had occurred one hundred years ago, the attendants quickly dressed and rushed out into the storm. Not until daylight came was it possible to tell just where the landslide had occurred. Soon it was discovered that the slide was on Mt. Webster and had almost reached one of the camp buildings on the east side of the river. The Saco had risen almost up to the road and was rushing southward at a mad pace. A traveller on foot from the north arrived shortly and told of the highway being entirely washed away near Flume brook. Attempts to drive a car south through to Bartlett had to be abandoned. Word came that the highway was in places absolutely obliterated. Not for several months was it safe to drive a car through the Notch.

The State Highway crew located at the southern end of the reservation had a narrow escape. The river rose very rapidly during the night and not until the cook was awakened by floating pails inside the camp, did he realize that their building was surrounded by water. Arousing the crew they hastened to the camp loft and remained there trapped in these cramped quarters until late in the afternoon. Had the building tipped over probably all would have been drowned in the rushing waters.

Within a few weeks, a road crew was located at the Willey Camps and began to fill in the washed out highway with gravel taken from the Willey pit. For several weeks trucks hauled this material to the road crews and it was not until early spring that the highway through the Notch was passable. Detours were necessary around the washed out bridges until they were replaced during the late spring and summer.

A small crew of men was maintained by the Forestry Department during the summer and fall to carry on needed improvements. An isle of safety about seventy-five feet long was made in the parking space between the highway and the river. Logs placed end to end and about fifteen feet apart defined the lines of this area. Loam was used to

fill the strip and spruces and firs were planted at suitable intervals. The whole space, after being seeded to grass, added materially to the appearance of the place. Autos park on both sides of this strip and it is possible that other parking places of this type may be made another year.



STATE LANDS NEAR CONWAY

All the brush on both sides of the river was cut and burned. Gravel was used to fill in the deep holes and unsightly places while a bridge was built across the river at the upper end of the parking space. The old dam built several years ago was in bad condition and needed to be replaced. The wings were extended holding back the water as far as possible. This improvement was not expensive and formed a pool which became quite attractive and has many possibilities for adding to the beauty of this locality. The hardwoods on the easterly side of the river

were cut out and eventually this place will form ample picnic grounds. Additional toilets were built adjacent to the camp ground which improved the sanitary conditions of the place. Several camps formerly used to store equipment or gas and oil were moved to more suitable locations. A beginning has been made to extend the present back road across the gravel pit and through the strip of wood to the main highway. The vista of Mt. Washington at Deep Hole bridge was again opened and widened. Brush on both sides of the Cascade and Flume brooks was cleared away and an opening made in the woods back of the Willey Camps near the railroad tracks which allows a view of the valley below.

The first band concert ever heard in Crawford Notch was given by the Fifth Infantry of Portland, Maine, on the evening of August 8th. Several companies en route to Fort Ethen Allen, Vermont, camped for the night at the Willey House site as has been the custom for several years and Col. John W. Wright, the Commander, ordered the band to entertain the large crowd of tourists. The one hour concert was greatly enjoyed.

TOWN FORESTS

The possibilities of future revenue from town forests are beginning to be realized by people living in the states of the Northeast. With diminishing forest resources, greater freight rates and increased demand for all forest products people are now studying various methods of overcoming this timber shortage. Many towns in New Hampshire and Massachusetts have already received substantial returns from their forests.

Town forests of Europe are the main source for all fuel used in these towns. In Switzerland two-thirds of all the forests are owned by the communities, Germany twenty per cent; Sweden four per cent; France twenty-two per cent; Czecho Slovakia twenty-nine per cent and Bulgaria fifty per cent. Many of the towns of these countries escape all local taxes due to the fact that the revenue derived from these forests is sufficient for the entire support of these towns. The forests are usually supervised by one of the state foresters and kept under the best possible management. They are divided into blocks or compartments and sales of timber are constantly being carried on. All trees for sale are marked by the forester and sold to the highest bidder.

In Switzerland most of the community owned forest land is held largely as an investment, but also to maintain a forest cover on the water sheds and for recreational purposes. The Alpine village of Aurozono enjoys the distinction shared by few communities. It has no tax collector. This village has fine roads, plenty of good drinking water, free schools, free medical attendance, free libraries and electricity at five cents a kilowatt. The town fathers manage the communal forests and farm lands so well that the proceeds pay all the town expenses. There are consequently no taxes levied on the citizen. There are neither rich nor poor in Aurozono. Many people live in their own homes. The commune supplies fire wood and stones for those who wish to build. A number of the residents have been to

America. When they saved enough to insure a comfortable life in Aurozona they returned to this village in Switzerland and are enjoying many of its benefits. Many other European towns have a similar record.

On December 7, 1928, there was held in Boston the first meeting of its kind for those interested in town forests. About 100 persons were present which included state foresters, forest experts, members of local town forest committees and others. Papers were read on the management of town

WARNER'S TOWN FOREST PRODUCES FUEL FOR ALL TOWN BUILDINGS

forests in Europe and the progress made by many towns in this country. Discussions followed and the all day meeting was of benefit to the many who attended.

Much progress is being made by many of the towns in New Hampshire in acquiring forest land. With thousands of acres of waste land which can be purchased from $5.00 to $10.00 per acre and much of this land adjacent to good markets, many of our cities and towns have failed to realize the opportunity of forest ownership. Forest land should be acquired for protection of water supply system and refor-

estation of areas adjacent; for future development of parks for recreational purposes; and for the many uses that towns have for all forest products.

On account of a surplus in the State Nursery in the spring of 1928, thirty-two cities and towns accepted an offer of free trees from the department and planted 267,000 on their town forest lands. Approximately one and three-quarters millions of trees have been planted on these lands with an estimate of about $400,000 valuation. The following table shows 73 towns owning forest land with a total acreage of 14,376 acres:

LIST OF TOWN FORESTS

Town	Area	Date Acquired	No. Trees Planted
Alton	8	1924	
Antrim	58	1893-1927	15,000
Auburn	10	1925	
Boscawen	8	1917	8,000
Brentwood	4	1917	
Campton	25	1886	
Claremont	550	1890-1916	160,000
Concord	500	1872	157,000
Conway	10	1917	
Danville	75	1775	
Deerfield	5	1908	
Derry	60	1920	5,000
Dover	5		4,000
Dublin	50	1925	
Dummer	160	1927	1,000
Durham	65	1900	15,000
Effingham	150	1915	
Errol	150	1804	20,000
Exeter	3	1911	
Fitzwilliam	23	1927	
Franklin	184	1893	18,500
Gilsum	100	1901	10,000
Gorham	200	1912	
Grantham	125	1818	
Greenfield	22	1878	
Hanover	1,417	1921	68,000
Henniker	50	1921	
Hillsboro	36	1928	5,000
Hollis	201	1916	21,000
Hopkinton	59	1890-1925	8,000
Jaffrey	503	1773-1915	116,000
Keene	1,910	1875-1918	97,000
Kingston	10	1923	3,500
Lempster	31	1901	
Littleton	1,087	1921	500
Londonderry	2		
Loudon	119	1908	
Lyndeboro	5	1890	
Madison	158	1924	
Manchester	1,800	1926	834,000
Marlboro	53		
Mason	27	1923	
Meredith	175	1896	
Merrimack	93	1925	6,000
Milan	300	1895-1926	3,000
Milton	140	1839	

LIST OF TOWN FORESTS—*Continued*

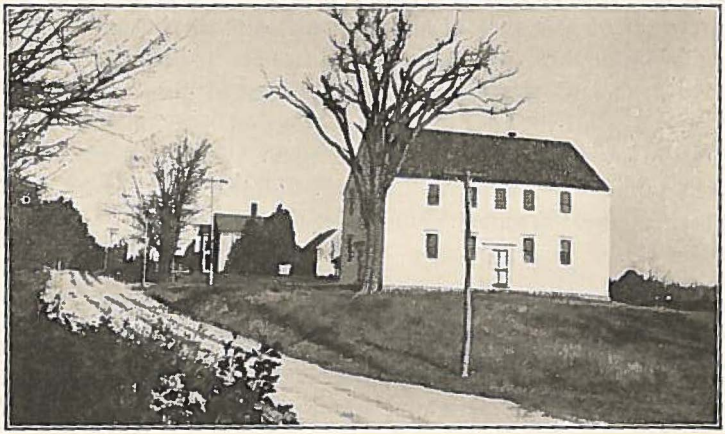
Town	Area	Date Acquired	No. Trees Planted
Mt. Vernon	8	1900	
New Boston	8	1916	
Newington	112	1710	10,000
Newport	30	1898	
*Northwood	400	1773	26,000
Peterboro	11	1903	
Pittsfield	68	1924	8,500
Portsmouth	240	1886-1917	14,000
*Raymond	12	1918	1,000
Richmond	846		75,000
Salisbury	40		
Sandwich	7		2,000
Somersworth	10		7,000
Springfield	40	1917	
Sullivan	100	1859	
Sunapee	100	1928	
Swanzey	175	1928	
Unity	3	1885	
Wakefield	100	1925	4,000
Walpole	200	1925	5,000
Warner	804	1920	34,000
Warren	80	1914	6,000
Weare	100	1837	
Webster	16	1874	
Winchester	66	1927	500
Wolfeboro	34	1910	5,000
Woodstock	40	1897	1,000
	14,376		1,774.500

* School Forest

Danville

This town has one of the most unique town forest records of any in the State. For one hundred and fifty-eight consecutive years or since 1790 this town has appointed a parsonage committee which have had as part of their duty the management of 75 acres of forest land,—one a 55 acre piece and the other a 20 acre piece. This committee cut and used the lumber for the building and maintenance of the first meeting house and parsonage. During these years the receipts from the sale of wood have been deposited in banks until the fund has now reached almost $10,000. Every year at the March town meeting there is a warrant usually as follows: "To see how much of the Parsonage Fund the Town will vote to spend for preaching for the year ensuing." Thus the town of Danville hires its own preacher and decides how much money they will pay him.

Much interest centers about the first settled minister of this parish. At a meeting held August 29, 1763 it was voted to extend a call to Rev. John Page of New Salem to become the minister of the parish, giving him six acres of land and sixteen hundred pounds old tenor towards building his house, also eight hundred pounds old tenor in bills of credit for his settlement. As salary he was to receive forty-five pounds sterling annually together with the use of the parish land and various other privileges. To this was added annually twenty-five cords of wood cut and corded at his house.



FIRST MEETING HOUSE AND PARSONAGE, BUILT FROM TIMBER CUT ON DANVILLE TOWN FOREST

His letter of acceptance appears under the date of September 24, 1763 and it was decided that his ordination be held December 25, 1763. From that time to the present, different preachers have carried on this work of the Gospel and have been paid in part from the sale of wood cut from the town forest.

The two tracts were probably set aside at the time the town received its charter and as was the custom in many towns were called the Ministers lot. A careful study of the old parsonage committee records shows receipts from the sale of wood and timber up to about 1830. Many hundred

dollars worth of timber is recorded as sold and used for repair of the meeting house, the Parsonage and the fences about the two cemeteries. From 1830 until about 1880 the receipts came from rentals of pasture, the sale of rye and hay, making over $1,000 from this use. In 1865 another growth of timber had matured and $1,500 worth was sold at that time. In 1895 the records show that $4,500 was received at auction for sale of timber on the 55 acre piece and the money deposited in the bank. In 1903, about $1,200 was received from the sale of wood and timber on the 20 acre piece. With almost $10,000 in the bank as a result of this careful management, can any one doubt the wisdom of these parsonage committees in holding on to their two tracts of forest land? Other towns in the state had set aside a Minister's lot or a School lot, but later on sold their lands for small sums or traded them away. Danville has set a unique example and Clarence Collins, the present chairman of the Parsonage committee, is custodian of all the old records.

Winchester

A tract of 66 acres of woodland was presented to the town of Winchester on April 30, 1927 through the generosity of Mrs. Willard H. Jennings and her daughter Mrs. LaFell Dickinson. The presentation of this tract which comprises a large part of Meeting House Hill was made on the summit from which a wonderful view of the surrounding country may be obtained. Guy C. Hawkins of Winchester introduced Mrs. Dickinson who made a short speech and then presented the deed to the chairman of the Selectmen who accepted it for the town. Addresses were made by James H. Bliss, member of the town forest committee, Ralph L. Morgan of Richmond and Philip W. Ayres of Boston, Mass. After the exercises an inspection of the tract was made and of the 1,000 pine trees which had previously been planted by the children of the Center School. Inviting trails across the tract and over the mountain have been made by members of the Men's Club of the local Universalist Church.

The tract is situated but a few minutes walk from the village and is very accessible. It was partly cut over 18 years ago but there are about 10 acres of pine 25 years old.

The tract was given in memory of Willard H. Jennings, for many years a resident of Winchester and to be known as the "Willard H. Jennings Forest." This is a fitting memorial, for Mr. Jennings was a large timber land owner and had desired for some time before he died to present the town with land which might be used as a town forest. An excellent opportunity is now offered to the people of Winchester to interest themselves in the development and improvement of this gift to the town.

Twin Bridges—Merrimack

Located within a quarter of a mile of the Town Hall and only a short distance from the Daniel Webster Highway lies a tract of land called the "Twin Bridges," one of the most picturesque places in the town. Baboosic Brook, tumbling over the rocks and ledges, calls to the traveller to pause for a moment but the hurrying throng passes over the highway unmindful of the charm and restfulness of this beauty spot. Some of the towering pines still stand and with the mixed hardwoods, young growth, "white water" with valuable water rights, and quiet pools, it is gratifying to know that this tract is now held in public ownership.

When the axe was first heard biting into the stately pines and the dull thud of the forest monarchs reached the ears of some of the citizens of the town, a movement was started to arrest this slaughter by buying the land and growth for the town. Negotiations were opened with the owner who consented to stop work on the lot, but insisted that a settlement in full be made at once. This was in the fall of 1926, with Town Meeting many months away. Knowing full well that this desirable tract should be secured by the town at the price set, ten citizens advanced the money, each paying the same amount, and acquired ownership to the tract. At Town Meeting 1927 the town voted to buy this property

from the holders and have it managed by the Town Forestry Committee. The deed was turned over to the town later in the year.

An island of three or four acres, formed by the division of the brook, is a most alluring place to spend one's spare time and commune with nature. The twin bridges which spanned the brooks in the olden days, connecting the island with the main land, have rotted away and disappeared. Two new bridges for foot-passengers have now been erected through the generosity of one of the committee; and other persons have given financial aid so that a small sum is available for further improvement work.

This tract was bought as soon as possible after cutting had begun, but not before about four acres had been stripped clean of all pine growth. This open space has now been planted to white and red pine at no expense to the town; the State furnishing the trees, and the boys from the McGaw Normal Institute and the Grammar School giving their time and doing the planting under the direction of the committee.

A day or two has also been given by several interested citizens in improving the woodland by the removal of the dead wood and worthless trees, and burning the slash which was left after lumbering.

Another interesting thing which will appeal to many is the permission granted by the committee to the Horseshoe Fish & Game Club and the Merrimack Chapter of the Izaak Walton League to construct a pool on the reservation for the rearing of trout to stock the brooks in the immediate vicinity. Work is already well underway.

With the forest activities of thinning, pruning, and planting the new rearing pool for trout, and an ideal recreation resort, this area will be the mecca for many persons during the coming years. May this tract always remain in public ownership for the use of those who delight in the "great out-of-doors."

Dewey Woods—Sunapee

By Herbert Welsh, *President*

Sunapee Branch
Society for Protection N. H. Forests

The Dewey Woods near Sunapee Village have been an inspiration during half a century to all who have had the good fortune to become acquainted with them. Surrounded by four highways, this tract of 100 acres stands in the midst of the residential district of Sunapee Harbor, near enough to the Village to afford a delightful place of rest and recreation to all. It was held during more than fifty years by Mr. and Mrs. Daniel Dewey, both now deceased. During their lifetime, they carefully tended these beautiful woods. Many of the pines, hemlocks, and beeches are more than 100 years old. They tower into the sky. Their trunks catch the changing colors of light and shade in a way peculiar to the deeply corrugated bark of old trees.

The heirs of Mr. and Mrs. Dewey placed this property on the market at $5,000, toward which Mrs. John C. Dewey, one of the heirs, contributed $500, in memory of her parents. Through generous co-operation on the part of citizens in Sunapee, $2,000 toward this purchase was contributed by vote in town meeting. The remainder was procured through contributions of persons in Sunapee and vicinity who know and love this beautiful region. The business was transacted through a committee of the citizens of the town, working with a committee of the Sunapee Branch of the Society.

Many discouragements were overcome. The entire sum, at length, was contributed. Title rests in the town of Sunapee. This is an excellent example in forest saving to all New Hampshire towns.

Swanzey

Mrs. Lucy J. W. Carpenter who died July, 1928, at the age of 94, willed to the town of Swanzey her old farm of

175 acres. The Carpenter Homestead is located on the northeasterly slopes of Mount Caesar and has been held by the Carpenter family for many generations. The first church in Swanzey was located on this farm and on a ledge back of and above the house is a boulder marked as follows: "On this ledge was erected the first meeting house in Swanzey, 1737." The old house is to be used as a home for unfortunate people and a fund has been left to maintain it. Although much of the valuable timber has been removed, there are young stands of pine growth left on the lot.

Besides the Carpenter lot the town of Swanzey has been left a small piece of land on Swanzey Lake for a Town Picnic Ground. Swanzey claims the distinction of being the original town to hold town picnics or old home days, having held them continuously for the past fifty years.

The "Town Pines" which border both sides of Main Street have an interesting history. Nearly fifty years ago the Congregational Minister gathered all the townspeople together, men, women and children and under his leadership and instruction they planted 1,000 pines along this street, the men digging up the trees in the woods, the boys doing the transplanting and the women and girls watering the trees and supplying a bountiful dinner.

Woodstock

The Woodstock town forest comprises 40 acres lying in two tracts—15 acres 2 miles west of North Woodstock village, donated to the town by the Publishers Paper Company in 1912 through the efforts of former State Forester E. C. Hirst. This area is well timbered with spruce and hemlock, the approximate estimate being set at 125,000 board feet. On this tract is located Agassiz Basin and Indian Leap, two important scenic attractions of the White Mountain region visited by thousands of tourists each season. Route 112 known as the "Kinsman Notch Highway" leading to Lost River passes close by this tract causing it to be easily accessible.

The other tract containing 25 acres and surrounding the town's water supply on Gordon Brook, was acquired by the town in 1897 through generous efforts of the late Samuel N. Bell, promoter and builder of the Deer Park Hotel. This tract is well timbered with hard and soft wood from which the town has cut much timber for highway and bridge construction work. The open spaces are being planted in with spruce and pine.

One important scenic attraction of comparatively recent development is "Balance Rock" located on this tract and easily accessible over a one mile trail leading from Route 112, three-fourths mile from No. Woodstock Village.

Lempster

In 1901 the Tax Collector for the town of Lempster accepted deeds in lieu of tax for two pieces of property. One tract of 70 acres was later redeemed while the other 30 acre piece has been retained since that time. As the land had recently been cut over, little value was placed on the tract and it was carried from year to year on the town books as property owned by the town. In recent years the selectmen were not able to accurately locate this lot and for a time it was practically lost. Inquiry several years ago in regard to the property brought forth a reply that it was over somewhere on Lempster Mountain in the eastern part of the town. During the year 1927 a steam portable saw mill set up and began to operate on a timber lot nearby and owners of lots in that section realized that boundaries and corners should be located and marked to prevent possible timber trespass. The selectmen were likewise anxious to locate the 30 acre piece and asked assistance from former nearby owners. After much search the lot was found but the careful work of a surveyor is needed to find two missing corners. This 30 acre piece has some valuable timber and is partially covered with a growth of spruce and fir.

THE COLLEGE WOODS—DURHAM

"PAUL BUNYAN" WHITE PINE CONTAINING 2,500 BOARD FEET (Durham)
Photo by Woodward

When the University of New Hampshire moved to Durham in 1893 it secured as part of the original Benjamin Thompson Estate 75 acres of woodland. This lay on rocky land between the railroad and Oyster River. The main part was a stand of old growth pine and hemlock which Mr. Thompson had refused to cut at all during his life time. While white pine and hemlock made up the principal part of the stand there was some red oak and black birch, so that it was a fair sample of original timber in this locality. Even now after considerable cutting the old growth timber averages over 50,000 bd. ft. per acre for 50 acres. The rings on the stumps of the older trees vary from 150 to 250 years. Most of the pines and hemlocks are over three feet in diameter breast high and the average height of the pines is above 100 feet. Perhaps the most perfect specimen is the tree called "Paul Bunyan" after the famous logger of that name. This is 52 inches in diameter 4½ feet from the ground, 115 feet tall and contains more than 2,500 board feet.

As already stated, Benjamin Thompson refused to allow any timber to be cut during his life time so that the tract was in a primeval state when the college took control. There were no paths and dead and dying trees had not even been removed. Needing timber for a horse barn the college naturally sought it in this most accessible place. Unfortunately, however, the cutting was a mining rather than a selective process so that a bad hole was left which is only slowly filling in. Since this sad experience, however, the policy has been to remove only the dead and dying trees and keep the tract intact for its recreational, laboratory and investigative value. The students and faculty use it daily for walking, and many of the college parties are held in the log cabin. Most of the laboratory work of the forestry students is done in the old growth timber because it is only five minutes walk from the class room and gives them an opportunity to see real timber and test themselves in a tract large enough to get lost in. As an investigative area the tract is ideal because it includes a variety of species, ages and methods of cutting.

It is planned not to open up the old growth timber by a carriage road but keep the entire tract for walking only. By so doing the protection and administration will be considerably simplified and the tract made to serve its highest usefulness as a recreation center, museum and research laboratory. In fact, it is the sort of thing that every community should have, a place for all to walk in the shade of tall trees, and a place where the wild flowers and birds and animals are allowed to grow and die as they did before man interfered. Such wild flower, bird and animal refuges are a very important part of our modern life. Every New Hampshire town can have one if it desires, not so big and not so heavily timbered as the College Woods perhaps, but still a bit of natural scenery to contrast with and give greater value to our formal gardens, our hard paved roads and long lines of square buildings.

In addition the College owns 351 acres of second growth

white pine ranging in age from 5 years to 70; 84 acres of mixed stands of pine and hardwood and 23 acres of plantations. At the present writing the College has title to 533 acres of valuable forest land in the town of Durham, with an estimate of 3,000 M board feet of saw timber.

DARTMOUTH COLLEGE GRANTS

It may be of interest to relate briefly the history of the "First Dartmouth College Grant." In 1768 Governor Wentworth of New Hampshire offered a township of land as an inducement to Eleazer Wheelock to move his Indian Charity School from Connecticut to New Hampshire. This School when moved became Dartmouth College. The Governor promised to reserve for this purpose the township of Landaff which had been previously granted in 1764, but had been forfeited for non-performance of conditions of settlement. It was granted anew to the College on January 19, 1770, exactly one month from the date of the College charter itself and the College came near being located within its borders. It was estimated that the township contained 25,247 acres of land.

The conditions of this grant were difficult and exacting; as it required a road four rods wide through the town to be cut, cleared and made passable for carriages within two years from the date of the grant. Further conditions implied that within four years sixty families should be settled and residents on the premises, twelve of them within the first year. The College made every effort to carry out the term of the charter and urged settlers elsewhere to move to the new grant. Up to 1774 fifteen hundred acres had been given to some twenty families and considerable improvements made on a tract of about 2,000 acres near the northwest corner of the town. Here was built the "College Farm" a branch of the main school consisting of a log house and a large framed barn. A saw mill was built in 1774 and a grist mill in 1775 on the north side of Mill Brook. Roads and bridges were also constructed at the expense of the

College. Three hundred acres were set aside for the first settled minister and the Rev. Ebenezer Cleaveland of Gloucester, Massachusetts, moved to this township with seven other families in 1780 and remained five years as minister. A public grammar school was built and erected on the College farm.

It was not until 1777 that the first grantors of Landaff began their first move for recognition after holding their original rights for thirteen years. Opposition to the College appeared and land speculators began to buy up some of the original rights. The trustees of the College made efforts to settle arising difficulties but met with little success. The Landaff lands had doubled in price and were thought a good investment. Land speculation began to introduce settlers in defiance of the College and annoyed the tenants and their improvements. In 1790 the whole dispute was laid before the Court of Escheats which was held in Haverhill. The decision was against the College and the trustees at their next meeting decided that further resistance would be useless and formally relinquished all the claims to the township.

The direct loss to the College for money expended in improvements and expenses in maintaining their title was estimated at about $10,000. Much litigation developed out of this unfortunate affair and claims were pending as late as 1806. The loss of a township which was situated so near and so advanced in settlement was a serious blow to the College.

On February 5, 1789, the College was given a grant of land by the State Legislature which is known as the "First College Grant." Ebenezer Webster, father of Daniel Webster, was a member of the Senate and greatly aided in the passage of this act which located the grant of eight square miles adjoining the old Canada line and the Connecticut river. A tract of land now Clarksville was estimated to contain by survey 40,960 acres, but this amount fell short on a later examination. The pressure of debt under which the College was then laboring, quickly caused the trustees to

apply for permission to sell these lands. In April 1792, within six weeks after the date of the patent, 20,000 acres were sold at a shilling an acre realizing 1,000 pounds and in February, 1794, another strip of 10,000 acres was sold for 1,250 pounds. The remainder of the grant which comprised about 6,000 acres, a large part of it bordering the meadow land on Indian stream and the headwaters of the Connecticut river was rented on long leases about 1821. Sales were made from time to time and the last of it was sold in 1872. The College title to this whole tract has now been lost and it realized only about $10,000. In 1792 and in 1794 appeals were again made to the New Hampshire Legislature asking assistance and reciting the great losses which had occurred in Landaff and the inadequacy of the first grant. In spite of much favorable sympathy no grants of land were made.

A new application from the College in the form of a grant of land was presented in 1807 to the Legislature which was then in session at Hopkinton. Governor Langdon was in favor of another grant and made a strong speech to the Legislature commending the encouragement of literature and giving all assistance to the College. After much debate the House finally passed the Act June 18th by a vote of 88 to 60. The land thus granted was located by Jonathan Freeman on the Maine border, just north of Wentworth Location and is known as the "Second College Grant." This tract of six miles square was for the use of the trustees and their successors and to be held by the trustees without alienations. In 1828 this grant was divided for leasing by the trustees and began to yield a small income. Although the land itself cannot be sold valuable crops of forest growth have been cut realizing to the College sums of money which have been most substantial.

A description of the Dartmouth College and Precinct lands of Hanover was made in the Department's report for 1921-22.

THE YALE DEMONSTRATION AND RESEARCH FOREST

The Yale Demonstration and Research Forest near Keene was acquired by Yale University through gift in 1913. It then included five non-contiguous lots with a total area of about 600 acres. Since then the area has been increased to over 1,300 acres. The policy has been to dispose of the

YALE DEMONSTRATION FOREST SHOWING RECENT REFORESTATION

more inaccessible lots and consolidate the forest into a contiguous tract on each side of the state highway between Keene and Swanzey with the object of building up an area of about 2,000 to 2,500 acres. Additions to the forest since 1913 were from funds contributed by the original donor and by others interested in consolidating the forest and extending its area.

The policy has been to spend all funds available from operation and endowment on, (a) completely stocking the forest, (b) protecting it from blister rust and fire, (c) developing and maintaining a woods road system eighteen miles in length, (d) making the cleanings necessary in

planted and natural pine to bring in completely stocked stands of pine, (e) payment of taxes. In the process of stocking the forest and building up the forest capital, the cutting of commercial timber has been kept as low as consistent with necessary earning power to support the silvicultural developments under way.

A conspicuous item of the annual expenditures is taxes. The average annual tax per acre increased from 31½ cents in 1913 to 77 cents in 1928. The total annual tax in 1928 was $995.82, including the tax on the Burt pasture. For the next decade at least the policy should continue of only selling sufficient pine, which when added to other income from the forest will pay the taxes and the cost of silvicultural and other operations incident to building up the forest capital.

Estimates of standing merchantable timber made in 1921 gave a forest capital of 1,675,000 board feet of which 1,436,000 board feet were white pine. Since then due to added growth and the increase in acreage, the forest capital is estimated to have nearly doubled. The annual cut of logs in recent years has varied from 10,000 to 15,000 cubic feet (100 to 150 cords) having a stumpage value varying from $5.50 to $6.75 per cord. Pine tops have brought during the past four years about 200 cords per year.

Three buildings have been erected on the forest since 1913, namely, the main lodge, a portable house and a one-room sleeping lodge, all located at headquarters near the spring on the Winchester road. No buildings of any character aside from the four mentioned above are on the property.

The outstanding characteristic of the forest, both from the viewpoint of economic operation and from that of demonstration and research, is its accessibility and nearness to markets. It lies in the very heart of the best white pine region in New England and but two miles from Keene, an industrial town of some 15,000 population. Its location, therefore, is most favorable for the demonstration of silvicultural practice to the public.

There are three distinct reasons for the establishment of this Yale Forest:

(1) Private forest owners will not undertake the practice of forestry on their own lands until they have had an opportunity to see forestry in practice—until they can see actual results attained, know the costs involved and the present or prospective profits from the undertaking. The Yale forest is a living demonstration of forestry in actual practice, not only for the benefits of forestry students but for the purpose of convincing the public of the economic advantages in managing forest property when suitably located in accordance with forestry principles. The forest is of far-reaching importance from the standpoint of public education.

(2) There is great need for specific information based on sound research, relating to reproduction, growth and development of various economic species when grown in stands under various conditions. This forest is a laboratory in which the School of Forestry is undertaking a constantly increasing program of research. Some of the results have already been published, other investigations have been completed and now await publication.

(3) Demonstration and research are the two foremost purposes which the forest serves but the future income from it is also important.

No better contribution to forestry can be made than this living example of forestry in practice when the public is encouraged to go to learn the art of its application on their own lands.

ACTIVITIES OF THE SOCIETY FOR PROTECTION OF NEW HAMPSHIRE FORESTS 1927-1928

The two outstanding events in the work of the Society for Protection of New Hampshire Forests during the past two years, have been:

Acquisition of Franconia Notch. Following the action of the legislature of 1925 which appropriated $200,000 toward the purchase of Franconia Notch, extensive negotiations were carried on by Governor Huntley N. Spaulding, and the President of the Society, Allen Hollis, with the owners of Franconia Notch, the Profile and Flume Hotels Company. An option at $400,000 was secured, giving to the Company the income from the Flume property for the seasons of 1928 and 1929. It became necessary for the Society to raise $200,000 which it was able to do. A legacy of $100,000 had been left to the Society by the late James J. Storrow to use in its discretion. Through the devoted and generous assistance of the State Federation of Women's Clubs, the additional $100,000 was slightly over-subscribed. More than 15,000 persons contributed to this sum, including volunteer gifts, not only from the Women's Clubs of New Hampshire, and of the other New England States, but also generous gifts from Chapters of the Izaak Walton League, Daughters of the American Revolution, the Grange, Posts of the American Legion, and of the Legion Women's Auxiliary, with generous volunteer gifts from many school children.

Six thousand acres in Franconia Notch have been transferred to the State and to the Society for Protection of New Hampshire Forests, under the following arrangement:—

The State has taken 5,000 acres at the North end of the Notch including the Profile and the Lakes. The Society has taken 1,000 acres at the South end of the Notch, including

the Flume, agreeing to turn this also over to the State of New Hampshire within twenty years. Meantime the Society agrees to use the revenues from the Flume property after the season of 1929, for forestry purposes in the State of New Hampshire.

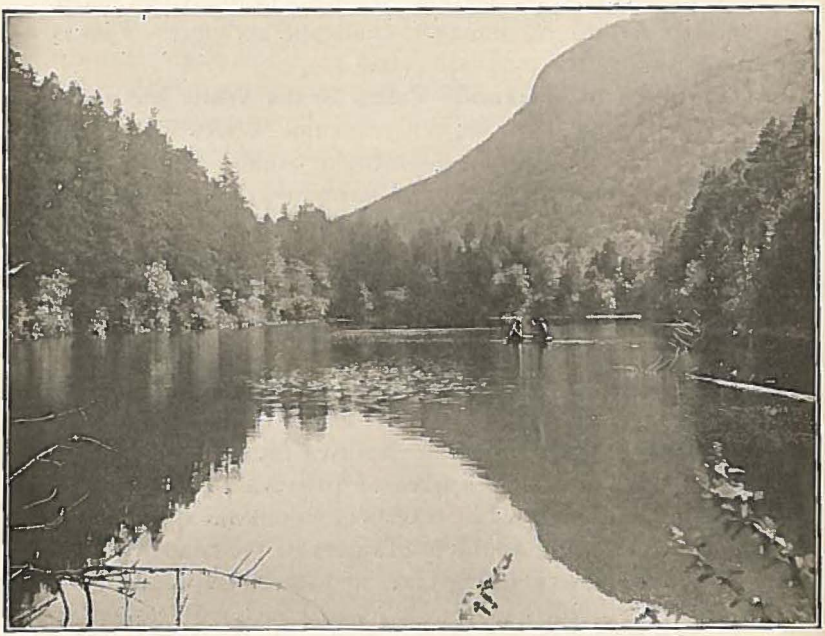
The Society has been able to contribute $5,000 to the State Forestry Commission during the past summer with which to assist in making improvements in the Notch under plans of Arthur A. Shurtleff, landscape architect. This is in addition to the purchase price.

Addition of Waterville Valley to the White Mountain National Forest. During ten years the Society has sought to induce the Federal Government to acquire the land and timber in Waterville Valley, as part of the White Mountain National Forest. Partial examinations were made by the Government without action, owing to the great value in standing spruce timber. The Government regarded the high costs prohibitive. Meantime, the property, which contains approximately 23,000 acres, was sold by the International Paper Company to the Parker & Young Company for a sum slightly in excess of $1,000,000. The property includes one of the most attractive scenic features found in the White Mountains, namely, 800 acres of primeval spruce timber, standing in a vast bowl of crags and mountains surrounding the Greeley Ponds, at the headwaters of the Mad River.

The new owners, facing taxes and interest upon their investment proceeded to plan a logging railroad from their mills in Lincoln through the Mad River Notch and over the Greeley Ponds with a view to cutting the entire region. Waterville Valley has never had a serious forest fire and the presence of a logging railroad in the midst of great quantities of slash following logging operations, would seriously threaten the destruction, not only of the Valley, with irreparable damage to its timber and soil, but also of the neighboring properties which had been acquired by the Government in the White Mountain National Forest.

A hearing was secured before the National Forest Reser-

vation Commission at Washington. This body is the purchasing board. Under the leadership of the President of the Society, the following organizations sent personal representatives to this hearing to petition that action be taken at once to save Waterville from destructive lumbering: New England Council, Boston Chamber of Commerce, Springfield Chamber of Commerce, New Haven Chamber



UPPER GREELEY POND, MAD RIVER NOTCH, NEAR WATERVILLE
Courtesy State Publicity Bureau

of Commerce, New Hampshire State Chamber of Commerce, Connecticut State Chamber of Commerce, Appalachian Mountain Club, Waterville Valley Association, American Forestry Association, National Conference on Outdoor Recreation, Massachusetts Forestry Association, New Hampshire Forestry Commission, and the Governor of New Hampshire. The late J. Randolph Coolidge, of Sandwich, was a personal representative of Governor Huntley N. Spaulding.

The National Forest Reservation Commission directed that a careful cruise of timber values be made. Finding present the values which the owners claimed, Colonel William B. Greeley, then Chief of the Forest Service, recommended the acquisition of the entire tract by the Government, if terms could be made with the owners. The Parker Young Company agreed to sell exactly at cost, and co-operated heartily in bringing the property into public ownership.

Under the active leadership of the New Hampshire delegation in Congress and with the generous co-operation of many members of Congress, not only from New England, but also from Southern and Western States, Congress passed the McNary Woodruff Bill, which authorized a sufficient sum for this Waterville purchase. Later a second delegation representing the same organizations, called personally upon President Coolidge at the White House. By means of a special recommendation from the President to Congress, the money finally was appropriated, and Waterville became a part of the White Mountain Forest.

No logging railroad will be constructed in Waterville. Under Government regulation, 6,000 acres of spruce timber in the Valley will be sold during the next fifteen years, at a price that will nearly return to the Government the entire cost of purchase. Thirteen thousand acres which have been cut over in this Valley, during the past thirty years, will not be re-cut. This comprises one of the largest and most promising bodies of growing timber in the White Mountains. Roads and trails in the Valley will be protected. Extraordinary care will be taken to keep out forest fires. Best of all, the Government has set aside 800 acres in the wild country surrounding the Greeley Ponds to remain forever untouched, as an example of primeval spruce wilderness.

Purchases on Mount Monadnock. There are now 2,598 acres in public ownership on Monadnock, distributed in ownership as follows:

State of New Hampshire	773 acres
Town of Jaffrey	200 acres

Society for Protection N. H. Forests	1,625 acres
Total	2,598 acres

During the past two years, the following additions have been made on this mountain:

Gift of 200 acres to the State by Mrs. Arthur Poole, of Jaffrey.

Gift of 80 acres to the State by the Misses Etta and Ella Sawyer, of Jaffrey.

Gift of 50 acres to the Society, by Maro S. Brooks, of Medford, Mass.

Purchase of 100 acres by the Society with funds contributed by Prof. Wm. Emerson, of Massachusetts Institute of Technology.

Purchase of 200 acres by the Society with funds contributed for this purpose.

All of the above are on the Jaffrey side of the Mountain.

Purchase of 500 acres by the Society with funds contributed for this purpose. This property is located in Dublin. It extends for more than a mile on both sides of the Darling or Farmer Trail, which is the easiest approach to the summit from the Dublin side. It contains more than 200 acres of promising young growth and many fine old trees along the trail.

A further purchase is proposed of 455 acres which is a part of the Ark property in Jaffrey. This contains a large tract of magnificent pine trees, nearly one hundred years old, besides extensive young pine stands, which can be acquired for $10,000. To assist in its acquisition, the Water Board of the Town of Jaffrey will take an area of 156 acres, formerly cut over, adjoining the town reservoir, at $1,500. This leaves $8,500 to be secured by the Society prior to the first of April, 1929. All who know and love Monadnock are urged to assist.

Purchases About Sunapee. Through the Sunapee Branch of the Society, of which Mr. Herbert Welsh of Sunapee and Philadelphia is President, various tracts on Mount Sunapee have been acquired; these total 976 acres. During the past two years, the Dewey Woods of 100 acres, located near the Lake Shore at Sunapee Village has been acquired by the Town of Sunapee through the efforts of the Society and fully described under town forests in this report. The State Forester and other members of the State Forestry Department, assisted in bringing about these results.

Forestry in Summer Camps. In the hundreds of summer camps which are located in New Hampshire an attendance of 17,000 is registered by the State Department of Agriculture; these children come, largely, from the cities. During the past two summers, the Society has employed foresters to go from camp to camp, giving instructions to directors, councilors, and camp children, teaching through wood-craft and forest projects, such as planting and thinning the camp properties, the true significance of the forests, and its vital importance to the country at large.

Encouragement to Boys in Their Home Woodlands. Under the leadership of the boys and girls club agents of the State, with the active co-operation of the State Extension Forester, Kenneth E. Barraclough, and of the Forestry Department in the State University, 500 boys in the 4-H Clubs and a few girls have undertaken forestry work in their home woodlands.

The part of the Society has been to provide a series of prizes in each county, including not only bronze and silver badges, but also attendance during several days at the annual club gathering at the University, and the expenses of two who received highest awards, at the Agricultural Exposition in Springfield, Mass.

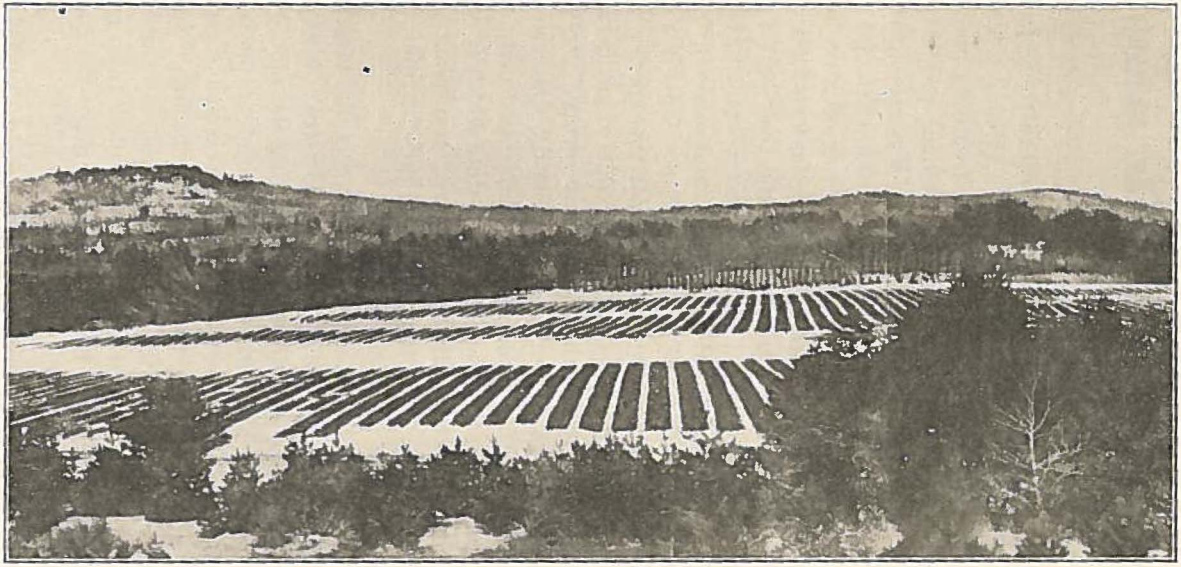
Roadside Forest Reservations. Five years ago the Society organized a committee for the preservation of forest reservations along the highways of New Hampshire. Special deeds were formulated for conveying to the towns

forest growth within the limits of the highways. The Legislature of 1925, at the request of this Committee, reorganized the system of town tree wardens, placing the appointment or discharge of these officers in the hands of the State Forester.

The object of the Committee is not to plant trees but to save the beautiful woodlands along the highways that now adorn the State. Seventeen reservations have been established either by gift or purchase since this Committee was formed. Some of these are strips from 100 to 300 feet wide on either side of the highway. Some of them convey merely the growth within the limits of the highway.

Recently an extensive study of a sample county (Cheshire) has revealed 124 roadside strips that should be placed in public ownership. Each of the other counties probably contains a like number. If New Hampshire can save 1,000 strips of beautiful forest along its highways, it will add incomparable attractions not only for enjoyment by its own people, but also by visitors from other States.

To assist in bringing this about the Legislature should appropriate funds to be expended in the discretion of the Governor and Council, on recommendation of the Forestry Commission, in enlarging and stimulating various contributions from towns, civic organizations and individuals for the purpose of bringing into public ownership many of the beautiful strips of forest land along our highways.



STATE FOREST NURSERY (Upper Level) Boscawen. Transplant beds containing 4 million trees ready for shipment. Trees are sold at cost for forest planting within the State.

REFORESTATION—STATE FOREST NURSERY

The State Forest Nursery produced in the past biennial period ending June 30, 1928 a total of 3,119,632 trees for forest planting. These trees were almost entirely pine and spruce, and approximately twice the amount produced in any two previous years since the nursery was established in 1911. Of those purchasing trees, it is estimated that fifty per cent of the buyers purchased for planting on farm lands. The balance was divided among several classes of planters, principally individuals, municipalities, and over half a million planted on state lands. White pine continues to be the tree in the greatest demand by planters, and made up about seventy-five per cent of the nursery output. This is a drop of about five per cent in the demand for this species from previous years. This drop is probably due to an increased demand the past two or three years for spruce. Previous to this an order was seldom received from the southern part of the state asking for spruce. Now with this demand considerably increased, and the four years' time which is necessary to build up the supply of spruce transplants, the Forestry Department is obliged many times to refer prospective purchasers to other nurseries.

This increase in the demand for spruce is due largely to the plantings made for growing Christmas trees. Many are planting the spruce with the pine by setting the pine on an 8 x 8 foot spacing and then setting the spruce in the center of the square. This allows the spruce a reasonable time to develop, but should not be tried on a closer spacing. Spruce should never be set among sprouts when they are intended for Christmas trees. The sprouts prevent them from growing side branches, which must develop to make the conical tree desired by the public.

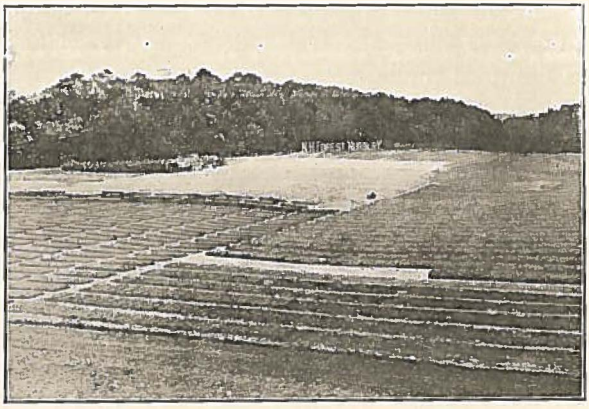
The seed situation is as varying in quality and price, and as uncontrollable as it has been in the past. Seed produced

a year ago for some unknown reason was not as good as usual; however that which was collected in New Hampshire in the vicinity of the nursery proved to be much more satisfactory than that gathered elsewhere.

It is now quite generally believed that if we are to grow a better type of lumber tree we must begin at the time the seed is collected, being more careful to select seed from the best rather than from any type of tree. Seed should also be collected as near to the locality where the trees are to be grown as possible. If the seed cannot be had from nearby, it should come from a place which conforms in growing condition and climate as near as possible to the place where they are to be used. In some foreign countries, where officials have grown forest trees for a great many years, they have divided the country into sections and forbid that seed be planted outside the area in which it was collected. This should be a guide post to American nurserymen in spite of the difficult problem it presents.

In addition to the usual maintenance of the buildings at the State Nursery, electric wiring has been installed, and permanent foundations placed under two small cottages, a house used for storing fire tools and another shed serving as a carpenter shop and wood shed. In each case the foundation is now of cement, extending below the frost line.

Additions to the equipment during the two years include a line of overhead sprinkling system with oscillators, three hundred seed frames for protecting the seed beds, three thousand feet of snow fence for giving the growing seedlings half shade, seventy-five hickory slat crates for shipping trees, and a Ford dump truck for bringing the trees in from the field, and assisting in leveling the nursery area. Continued permanent improvement to the land has been made and a tool house built on the upper nursery level in back of the water tank. This has been done with the assistance of the Federal Government through the Clarke-McNary Law which amounts to approximately two thousand dollars a year. Federal aid has been used also in adding to



LOWER LEVEL OF STATE FOREST NURSERY ALONG DANIEL WEBSTER HIGHWAY IN BOSCAWEN

the nursery area on the upper level by removing the brush and stone and then killing the witch grass by continued plowing and harrowing. Two other areas totalling about an acre and a half on the lower nursery level by the Daniel Webster Highway were levelled and given surface drainage. These areas were lower than the land around them, which caused ice ponds to form after the ground froze, and made them useless for nursery purposes. This condition was corrected by removing the top soil, levelling the sub soil and then replacing the top soil. The work was done with a Fordson tractor and a large scraper made especially for the purpose.

The following tables show the output of the nursery for the fall and spring periods of the last two fiscal years and the value of the nursery stock produced.

NURSERY OUTPUT; FALL 1926—SPRING 1927

Age of Stock	White Pine	Red Pine	Sugar Pine	Scotch Pine	White Spruce	Norway Spruce	White Ash	Poplar	Total
4 yr. tps.	676,325	106,787	700	25	62,572	.....	.....	.....	846,409
3 yr. tps.	340,250	74,250	.....	.....	70,275	.....	.....	.....	484,775
2 yr. seedlings	257,000	11,200	.....	.....	.....	.....	29,375	.....	297,575
Cuttings	.....	.....	.....	.....	.....	.....	.....	4,000	4,000
Total	1,273,575	192,237	700	25	132,847	.....	29,375	4,000	1,632,759

NURSERY OUTPUT; FALL 1927—SPRING 1928

Age of Stock	White Pine	Red Pine	Scotch Pine	White Spruce	Norway Spruce	White Ash	Black Walnut	Total
4 yr. tps.	959,150	227,384	25	47,554	4,100	.....	.....	1,238,213
3 yr. tps.	181,410	31,500	.....	1,000	1,000	.....	.....	214,910
2 yr. seedlings	6,000	.....	.....	.....	.....	27,250	.....	33,250
Whips	.....	.....	.....	.....	.....	.....	500	500
Total	1,146,560	258,884	25	48,554	5,100	27,250	500	1,486,873

Value of Nursery Stock Produced

Year Ending June 30, 1927

Trees sold to private planters	$8,308.34
Trees used on State Land	1,585.47
	$9,893.81

Year Ending June 30, 1928

Trees sold to private planters	$5,908.41
Trees used on Town Forests (252M)	1,972.10
Trees used on State Lands	2,164.31
	$10,044.82

Free Trees Furnished to Towns—1928

A change in policy of providing the towns and cities with free trees for planting on municipal property greatly increased the plantings on town forests and about water supplies in 1928. Thirty-two towns and cities planted 267,000 trees as a result. Four year transplants were supplied and these were all white pine except some 60,000 red pine.

Following are the towns accepting the offer of trees and the number planted by each: Antrim, 15,000; Berlin, 1,000; Claremont, 25,000; Concord, 3,000; Dover, 6,000; Dummer, 1,000; Durham, 5,000; Errol, 20,000; Gilsum, 10,000; Hanover, 10,000; Hillsborough, 5,000; Hopkinton, 8,000; Jaffrey, 31,000; Kingston, 3,500; Littleton, 4,500; Manchester, 25,000; Merrimack, 6,000; Milan, 3,000; Newington, 2,000; Northwood, 16,000; Pittsfield, 5,000; Plymouth, 500; Portsmouth, 4,000; Richmond, 25,000; Sandwich, 2,000; Somersworth, 7,000; Wakefield, 2,000; Warner, 12,000; Warren, 6,000; Winchester, 500; Wolfeboro, 2,000; Woodstock, 1,000.

Planting on State Land

Planting on state land for the biennial period ending June 30, 1928, was the most extensive of any two years period in the history of the Forestry Department. The first year of

this period came within a previous appropriation which allowed for planting 250,000 trees on state land. In the fall 96,000 trees were planted on seven state forests covering an area of 125 acres and the following spring of 1927 154,425 trees were planted on 193 acres on eight state forests. No further appropriation being available for state land planting in the fall of 1927, money received from the Boston and Maine Railroad for fire damage to state lands was used to plant 135,000 trees on 132 acres of two state forests. This completed the planting program until the spring season of 1928 when it became apparent that trees which had been grown for state land work could not be sold and would therefore be lost unless they could be used on state lands. In order to avoid the loss, Governor Spaulding transferred $2,000 from his emergency fund to the reforestation account for this work, an amount equal to the deficit in the reforestation appropriation. With this sum 501 acres on nine state forests were planted with 298,550 trees. Great as the resulting benefit was, such emergency programs tend to increase the planting costs and cannot have the same value as if planned ahead and provided for by regular appropriations.

Each year certain plantings are made for experimental purposes, and they are expected to serve the double purpose of supplying needed information, and establishing a stand of timber. Conclusions can be drawn only after similar plantings are made several times under varying circumstances. It has been definitely determined, however, that red pine and white ash should be planted in the spring and not in the fall, and that spruce may be planted successfully either fall or spring. Conditions must determine whether a white pine plantation set in the fall will be successful or not. It is not recommended for fall planting on exposed areas, blueberry turf, or where too much duff covers the soil so that only a part of the root system comes in contact with the soil.

The following table shows the species and number of

trees set on different state forests and the acres covered on each:

PLANTING ON STATE LAND
BY TRACTS, NUMBER AND SPECIES

Tract	Acres Covered	White Pine	Red Pine	Sugar Pine	White Spruce	White Ash	Poplar	Totals
Bear Brook ..	58	37,000	....	....	....	....	....	37,000
Cardigan Mt..	48	....	....	500	38,775	7,950	1,000	48,225
Davisville	4	500	3,500	....	....	....	....	4,000
Dodge Brook..	65	40,000	....	....	....	....	....	40,000
Franconia Notch ...	5	2,000	1,000	....	2,800	....	....	5,800
Hubbard Hill..	175	54,000	....	....	....	6,000	....	60,000
Kearsarge Mt..	40	....	....	....	25,000	....	....	25,000
Mast Yard ...	146	81,000	71,350	....	....	....	....	152,350
Merrimack River	90	48,900	....	....	....	....	....	48,900
Nursery	61	25,500	....	200	2,500	4,000	1,000	33,200
Pawtuckaway Mountain.	56	19,000	15,000	....	4,000	1,000	....	39,000
Ponemah	20	13,000	....	....	....	....	....	13,000
Sentinel Mt...	25	15,000	....	....	10,000	....	....	25,000
Soucook Riv..	26	8,000	9,500	....	....	....	....	17,500
Totals .	819	333,900	100,350	700	83,075	18,950	2,000	548,975

FIRE DAMAGE PLANTINGS BY TRACTS

Tract	Acres Covered	White Pine	Red Pine	Totals
Blair	22	15,000	.....	15,000
Mast Yard	110	88,700	34,300	120,000
Totals	132	103,700	34,300	135,000

Total area state lands planted ..... 951 acres.
Total number of trees planted on state lands 683,975

SUMMARY OF COSTS

No. trees planted	683,975	No. acres covered	951
Cost—setting per M.	$7.51	Cost—setting per acre	$5.94
Cost—trees per M.	6.78	Cost—trees per acre	5.54
Complete costs per M. ..	$14.26	Complete cost per acre ..	$11.48

Summary of costs includes both state land and fire damage figures.

Select, Average and Cull Nursery Stock in Forest Planting

Nursery stock of the same age contains more or less variation in size. This causes extra handling and loss in preparing the stock for shipment whenever an effort is made to furnish even sized trees by culling out the smaller ones. Variation in size is generally brought about as a result of injury to some seedlings when they were transplanted from the seed beds. Speedy handling of masses of little trees, necessary in order to obtain low costs of production, often

results in injury to the bud, causing bushy or forked tops, or to the roots in which case growth in the transplant beds is slow, where the injury is not sufficient to kill them. Plantations using this poorer class of stock have been made by individuals with reasonable success, when it has been impossible to get selected trees. Such plantations have made fairly satisfactory growth over periods of years, although comparisons with selected stock have not been made. Experiments have therefore been started using different classes of trees of the same ages under the same planting conditions in order to secure concrete facts as to relative growth.

Four year old white pine transplants originating from the same source were selected for the experiment. As the trees were taken from the transplant beds they were collected in three classes, those which made the exceptional growth, the small inferior trees, usually thrown away, and the medium sized trees. These three classes or sizes of trees were then planted by the slit method on a second or medium quality site on the Merrimack River State Forest. The planting site was an old field, level and worn out, where the soil, cover and exposure would be the same. In addition to these areas, another planting was made on a first quality site, separated from the other but on the same tract, for comparison, identical methods and trees being used.

The following table shows the mortality, total height and first year growth of the four areas. The experiment should be continued over a sufficient period of years to arrive at final conclusions:

COMPARATIVE GROWTH EXPERIMENT WITH SELECT, AVERAGE AND CULL TREES

Quality of Tree Planted	Per cent Living	Per cent Dead	Average Total Height of Tree	Average First Year Growth
Extra large selected	88.1	11.9	15.12″	2.76″
Average run	95.9	4.1	8.75″	2.34″
Inferior—Culls	82.4	17.6	6.87″	2.32″
*Average run	96.6	3.4	9.29″	3.12″

*Situation the same as with the other trees except that it was a first quality site while the other trees were set on a medium quality site, the principal difference being that the medium site had a light sandy soil while the first quality site had a light loam soil.

Unplowed vs. Furrow Planting

Years ago when forest planting was not so well understood as now, various planting methods were advanced as necessary or desirable. Among them was the method of plowing furrows five or six inches deep and about six feet apart and setting the trees with a spade or mattock in the bottom of each furrow.

This method was tried out by the Department in the spring of 1916 in comparison with straight slit planting. The area chosen was a first quality planting site consisting of a run out field of about five acres, without any low areas where ice ponds might form in the winter and kill the trees. The field of a long rectangular shape was divided into four equal strips of one and one-fourth acres each. The two center strips were then plowed and the outside strips were left unplowed. One-half the field was then planted to white pine and the other half to red pine, and left entirely alone for the twelve years since the planting.

The following table gives the data collected during the fall of 1928:

Species	Treatment	Mortality	Average Growth
Red Pine	Unplowed	14%	12'—8"
Red Pine	Plowed	11%	11'—7"
White Pine	Plowed	9%	13'—3"
White Pine	Unplowed	7%	14'—0"

The principal fact shown by the experiment is the greater growth on the unplowed area. This can be attributed to the fact that in setting the trees in furrows five or six inches deep the root system is placed below the more fertile top soil. While the difference in height growth is small, little can be found in favor of planting trees in furrow. The cost is more and the growth is less. Cost of plowing was about $1.00 per acre.

Pruning For Clear Lumber

It is only within a few years that the value of pruning forest trees for growing clear lumber has received recogni-

tion as good practice. In fact it has been necessary for trees correctly pruned to actually produce clear lumber in order to disprove statements that the pruning of live limbs on white pine always results in loose knots or pitch pockets. Such statements have had some foundation where pruning has been incorrectly or poorly done, usually with an axe, a tool which should never be used in work of this kind.

A pair of double edge pruners with handles two or three feet long will give excellent results, with the added advantage of handling easily and quickly. A pruning kit made up of a pair of double edged pruners and a swivel pruning saw will make an ideal combination for pruning pines. These tools make smooth cuts and allow the limbs to be cut close to the trunk of the tree without injuring the bark. All cuts should be made as close to the trunk as possible without injuring the bark, except when there is a burl at the base of the limb, in which case the cut should be made close to the burl instead of the trunk.

Pruning for profit must necessarily begin when the trees are small in order to produce clear lumber which will not be cut away when the log is slabbed. Probably trees four inches in diameter breast high are as large as should be pruned in general practice. Pruning to one-half the height of the tree is another safe rule to remember in making the first pruning. However about fifty trees at the State Forest Nursery have been pruned to two-thirds their height for three years without any apparent growth injury. Trees about twelve to fifteen feet in height are of good height at which to begin pruning. This will allow the first log to be pruned in two or three operations, which is about as far as one should attempt to go.

As some of the earlier state plantations have now grown to pruning size, the first pruning operation was made in the winter of 1927 on a small area at the State Forest Nursery at Gerrish. Height and diameter measurements were taken on the pruned area as well as on a part of the same plantation left unpruned as a check on the growth of the pruned

area. All cost figures were kept. Every tree on this area was pruned although it is very doubtful if one pruning for profit warrants taking more than the dominant trees selected on a fifteen to eighteen foot spacing. On this area a check on the growth of the pruned and unpruned trees was desired.

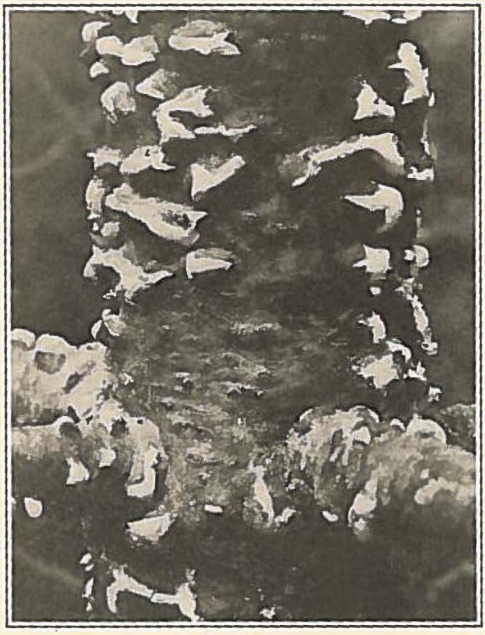
The following summary of data accumulated from the operation is believed to be a fair example of pruning of similar sized trees elsewhere.

Pruning Data

Labor—12¾ hours at	$3.50
Acreage	.461 acres
Number trees pruned	496
Average height of trees	15'—6"
Average D. B. H.	2 ⅞"
Average pruned height	6'
Linear feet pruned	2,950'
Cost per 100 linear feet	$0.162
Cost per acre	$10.34

WHITE PINE BLISTER RUST CONTROL

Review of Control Measures



BLISTERS BREAKING THROUGH BARK OF INFECTED WHITE PINE

(The dust-like spores within the blisters are carried by the wind to the leaves of currant and gooseberry bushes)

Courtesy U. S. Bureau of Plant Industry

A detailed review of the history of white pine blister rust control in New Hampshire since its inception in 1917 would disclose many interesting facts in connection with the growth and exploitation of northern white pine, that most valuable of all Eastern softwoods. Irrespective of drastic logging of this species, where little or no pretense is made to insure a future crop, so rapid is the growth and so great its ability of thrive on a variety of soils, that today, *white pine* is the predominant forest tree of the New England States.

Equally impressive is the importance of white pine in the lumber industry of this State. According to the Bureau of the Census, Department of Commerce, New Hampshire ranks third in the United States in the lumber cut of white pine. Within this State the cut of white pine is by far

greater than the cut of all other species combined, 71 per cent of all the lumber, both hard and softwood, cut in 1927, being pine.

In the manufacture of wood products white pine is pre-eminent, for nearly 50 per cent of all wooden commodities turned out by New Hampshire industries are made from this tree. Such lines of business as cooperage plants, manufacturers of boxes, toy factories, the match industry, producers of door and window sash, and a host of lesser enterprises all use white pine in their business, and for the most part depend upon a local supply. A large percentage of the timber which is grown on our farms, adding considerable to the farm income, is white pine. Therefore, in view of the part which this tree plays in the economic structure of New Hampshire, it is most appropriate, as well as vital, that the State, towns and individuals should have carried on so vigorously the campaign against this menace to a valuable forest crop.

Control measures by towns, cities and individual owners of white pine growth was first attempted in 1918. Since that year there has been increasing interest and effort, so that up to the ending of 1926, more than 22,469,000 currant and gooseberry bushes had been destroyed on areas aggregating 1,757,964 acres. In addition to the initial work over this large area, several towns and cities, as well as private owners, carried on a re-examination of lands covered several years previous. During the years of 1925 and 1926, re-eradication was conducted on 73,780 acres; an average of only about three bushes to the acre being found as against an average the first time over of nearly twenty.

Co-operative Control Work in 1927

In the spring of 1927, towns and cities to the number of 77 made available $28,800 for eradication, in co-operation with the Forestry Department, the State increasing these local appropriations twenty-five (25) per cent. Supervision, without charge, was furnished by agents of the Federal Office of Blister Rust Control. During the season 41 indi-

viduals, firms and associations co-operated to the extent of $3,983.31. In addition, control measures were put into effect upon certain State Forests.

The total of all initial control work carried on that year amounted to 151,759 acres, upon which were located and destroyed 2,166,825 currant and gooseberry bushes. Re-eradication measures with 20 towns and cities, 15 individuals, and on the Fox State Reservation in Hillsboro, totaled 74,034 acres.

Co-operative Control Work in 1928

Appropriations by towns at their annual meeting in 1928 were somewhat less than the previous year. This was undoubtedly due to the great flood of November 1927, which necessitated the expenditure of large sums in order to rebuild highways, bridges and other town roads.

However, 75 towns voted $26,300 and a few weeks later, four city governments made available $2,400. In addition, the Water Boards of three municipalities approved the expenditure of $600 for the protection of white pine plantations situated about their water supply. Thirty-seven (37) individuals and concerns put up funds aggregating nearly $6,000.

Initial control measures in 1928 were conducted on 145,329 acres and 2,941,402 bushes destroyed. Re-eradication, by 22 towns and cities, and 12 private owners, amounted to 82,201 acres.

Summary of Control Work 1918-1928

A summary of Blister Rust Control for the biennial period of 1927-28 indicates that 297,088 acres were examined in the initial program, and 4,208,227 currant and gooseberry bushes destroyed. The addition of all control measures from 1918-1926 gives a grand total for initial work of 2,055,052 acres, upon which nearly 27,000,000 bushes were destroyed.

Since 1925, re-eradication work was instrumental in examining 230,015 acres.

The Present Situation

Since the first year when the control of the white pine blister rust was undertaken in New Hampshire, 187 towns and cities have co-operated with the Forestry Department. Sixty (60) towns and cities have completed the initial examination, and five (5) concluded the second inspection of their pine areas.

Ninety-two (92) towns have carried on this work two or more years; 35 but one year, and 34 have never made any attempt to control this serious disease; irrespective of the fact that in many of them a considerable per cent of the pines have been found to be infected by the rust.

TWO HOSTS OF THE BLISTER RUST

(Growing near the stake is a wild gooseberry bush which—with the currant bush—is chiefly responsible for spreading blister rust. At left is small pine already infected with the disease)

Courtesy U. S. Bureau Plant Industry

Recent investigations by the district blister rust agents—employed by the Federal Office of Blister Rust Control — indicates that in many of these 34 non-co-operating towns new infection on white pines has developed in the past three to four years. This fact demonstrates clearly the necessity for the removal of all currant or gooseberry bushes in and

around white pine areas. It is also desirable that similar work be conducted on lands where there is an intention to grow white pine in the near future.

The spread and development of this fungus disease is largely dependent upon climatic conditions, and seasons of extreme moisture, such as have occurred during the past three to four years, are extremely favorable to the further spread of the rust in those regions where control measures have not been undertaken. That blister rust has been unable to effect greater damage during the past ten years is due wholly to the energetic manner in which the towns and cities and private owners of this State have combated this serious menace.

Control Measures by Private Owners

While the majority of the work accomplished in blister rust control has been effected through co-operative action between the State and towns and cities, nevertheless, considerable eradication of currant and gooseberry bushes has been carried on by private owners, for the most part, in co-operation with the Forestry Department.

Owing to the fact that the early records of private control activities were grouped with town co-operation, it is impossible to give an accurate figure as to acreage and funds expended by individuals, forest associations, lumber and paper companies. However, the following is sufficiently close enough to indicate the volume of private effort. There have been slightly more than 600 owners of white pine growth who have made available about $45,000. The acreage of their lands totals approximately 137,000 acres. The total funds put up by these owners were not entirely expended, and several thousand dollars was returned to them upon the completion of the projects. This is also true of co-operative work with towns and cities.

Control Measures on Public Lands

Since 1923, considerable eradication work has been conducted on State owned lands, most of which come under

the supervision of the Forestry Department. In 1924 the woodlands of the State Sanatorium, at Glencliff in the town of Benton, were examined and a large number of bushes destroyed, the area comprising 506 acres. In addition, control measures have been put into effect on 5,666 acres, on 21 State Forests. The United States Forest Service has co-operated with this Department in the towns of Albany, Benton, and Woodstock, and about 4,400 acres have been protected.

Necessity for Re-eradication

During the many years in which the control of this serious disease of white pine has been carried on, not only in New Hampshire, but in 16 other States as well, experience has indicated that it is not possible, in all types of woodlands, to secure complete and final eradication of those plants which spread the rust. Even the most carefully trained and conscientious crews miss a bush occasionally, in most instances owing to its small size, or in pulling plants of skunk currant, whose roots are brittle, broken-off shoots are bound to occur. Furthermore, seed which is in the ground at the time of the first examination is likely to germinate and ultimately develop. Investigations by the Federal Office of Blister Rust Control indicates that often ground apparently free from all currant or gooseberry bushes, will, after logging operations, show new growth of these bushes.

In view of the fact that since the control of blister rust is the first attempt in the history of the world to destroy any plant injurious to an important timber tree, it naturally follows that complete eradication, the first time over the ground, is difficult as there has not been any previous experience to serve as a guide.

Realizing this fact many towns and cities, and quite a few private owners have, after a period of five or more years, commenced a re-examination of their woodlands. The first of this work was undertaken in 1925, and at the termination of the season of 1928 re-eradication had been conducted over

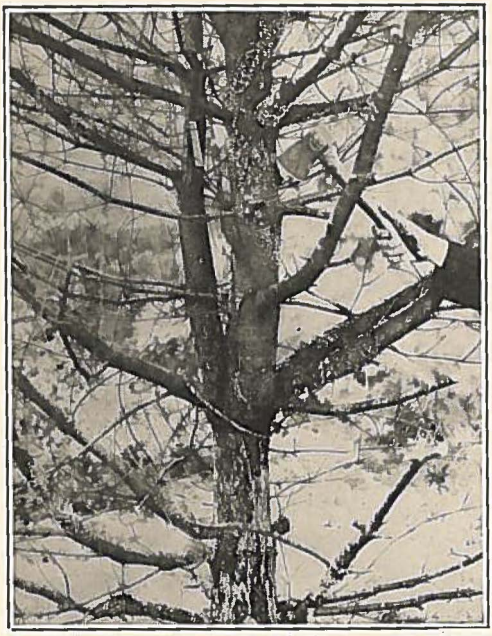
areas aggregating 230,015 acres, an average of slightly more than four bushes to the acre being found. Careful investigations brought to light the fact that a large percentage of bushes found the second time over had developed from seed.

Today, five towns and cities have completed re-eradication, and 21 have undertaken this second examination.

It is essential that re-eradication be conducted through State, town and city agencies, since, with but few exceptions, individuals cannot be counted upon to pursue this work.

Compulsory Appropriations by Towns

Elsewhere in this report a statement was given showing the number of communities which have completed either for the first or second time their program of controlling blister rust. There was also listed the number of towns carrying on control measures but one year, as well as those never appropriating for this work.



A YOUNG WHITE PINE IN THE LAST STAGE OF DEATH FROM BLISTER RUST
Courtesy U. S. Bureau of Plant Industry

The Forestry Department, and agents of the Federal Office of Blister Rust Control have made every effort to encourage control measures in these towns, and in spite of the generally statewide opinion that blister rust

is serious and white pine growth worth protecting, these 35 towns appear to have come to a definite pause in control measures, while the 34 non-co-operating communities stubbornly refuse to regard the disease as a serious menace.

Many of these 34 towns surround others which with far-sightedness, have completed their initial program of control, and yet, on account of the failure of their neighboring towns, the pine growth along their town boundaries is menaced by currant and gooseberry bushes across the line.

It would appear from the foregoing, that in justice to these progressive towns and cities which have completed the initial work, something should be done to speed up control measures in localities where nothing has as yet been accomplished.

Future Policy of Federal Government

While the so-called "Eight Year" program in blister rust control, instituted by the Federal Government in 1922, comes to a close in 1930, nevertheless, it now appears that the Federal authorities are likely to continue some form of aid to the states engaged in this work. Indications point to a continuance of the present educational program, perhaps on a slightly reduced scale, but along the same general lines which have proved so effective in the past.

REPORT OF THE LUMBER CUT

An act by the legislature of 1925, Section 63, Chapter 191 of the Public Laws, requires that every stumpage owner cutting or causing to be cut any timber, excepting cordwood and pulpwood, shall during the month of January of each year render a report to the 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.

The first report of cutting was received and tabulated for 1925 and given in detail in the last biennial report. In order that a comparison may be shown for the entire period for which reports have been received, a brief summary of the 1925 cut is as follows:

Cut for the year 170,652 M pine, 47,128 M other softwoods and 30,376 M hardwoods, totaling 248,156 M feet. The data obtained in compiling this report indicated that the bulk of cutting was done by about 200 operators.

The 1926 Report

Returns were received from 455 different parties, 152 of whom indicated no cutting, 76 reported a cut of less than 100 M, 52 as cutting between 100 and 250 M, 60 between 250 and 500 M, 47 between 500 and 1,000 M, and 68 as cutting over 1,000 M feet, some of the latter reporting a cut in excess of any during the previous year.

Cut for the year 135,121 M pine, 45,290 M other softwoods and 31,553 M hardwoods, totaling 211,964 M feet.

This information shows not only a decrease in the amount cut of 36 million feet as compared with 1925, but a decline in the number of operators cutting the most of the timber to about 175. The returns from 128 operators reporting a cut of less than 250 M each, total only 11,540 M, while the returns from 175 who reported a cut of over 250 M each, total 200,424 M feet.

The 1927 Report

Returns were received from 418 different parties, 159 of whom reported no cutting in 1927, 48 reported a cut of less than 100 M, 51 as cutting between 100 and 250 M, 33 between 250 and 500 M, 54 between 500 and 1,000 M, and 73 as cutting over 1,000 M feet.

Cut for the year 145,305 M pine, 34,055 M other softwoods and 22,615 M hardwoods, totaling 201,975 M feet.

This report also indicates a further decrease in amount cut of about 10 million feet as compared with 1926 and a further reduction in the number of operators doing most of the timber cutting to about 160. The returns from 99 small operators reported as cutting less than 250 M each, total only 8,718 M, while the 160 operators reported as cutting over 250 M each, total 193,257 M feet. The indications from these reports are that many of the small operators have gone out of business and those remaining are not cutting more than can be sold at a ready market. The reports as received have been found very satisfactory. The operators have been interested and have given much assistance in obtaining the necessary information.

The following table gives the number of operators doing the bulk of the cutting, and the total cut each year since the law became effective:

LUMBER CUT BY SPECIES, NOT INCLUDING PULPWOOD, 1925, 1926 and 1927

Year	No. of Operators	Pine	Other Softwoods	Hardwoods	Total
1925	200	170,652 M	47,128 M	30,376 M	248,156 M
1926	175	135,121 M	45,290 M	31,553 M	211,964 M
1927	160	145,305 M	34,055 M	22,615 M	201,975 M

TOWN TREE WARDENS

In 1925 changes were made in the roadside tree law, Chapter 93 of the Public Laws, particularly Section 22 which placed the appointment of tree wardens with the State Forester upon recommendation of the selectmen or other citizens of a town. Before 1925 tree wardens were required of all towns and cities but there was almost no information available as to what towns had tree wardens or what duties the tree wardens performed. In fact the tree warden law scarcely operated even to the extent of having tree wardens with any specific duties even in towns where there was a real interest and desire to look after the roadside and village trees. There was no one to be consulted with regard to protection or needed trimming of trees either by the town itself or by public service corporations in laying wires. City trees are generally looked after by some department of the city government. There are many towns in the state where there is no particular interest in the roadside trees or where there is little work for a tree warden to do. On the other hand there are many towns with village and larger rural population and civic responsibilities where the services of a tree warden are desirable even though popular interest may be dormant or lacking. It was felt that appointment of tree wardens by the State Forester in towns where there was real interest and recommendations were made either by selectmen or groups of citizens would be desirable and that growth and extension to other towns would follow as time passed and the work of tree wardens proved to be worth while. The following list gives for the year 1928 the names and addresses of tree wardens appointed under the 1925 act together with the towns for which they are appointed:

Name	P. O. Address	Town
John G. Marston	Suncook	Allenstown
D. W. Porter	Brookline	Brookline
Everett R. Rutter	Derry	Derry
Timothy F. Burns	Hopkinton	Hopkinton
Charles E. Chamberlain	Jaffrey Center	Jaffrey
James L. Dow	Lancaster	Lancaster
Eloi A. Adams	R. F. D. 6, Dover	Madbury
John E. Brogan	11 Park St., Nashua	Nashua
Ira S. Littlefield	New London	New London
Harry W. Smith	Groveton	Northumberland
Frank T. Garland	Pittsfield	Pittsfield
Fred S. Rowe	Plymouth	Plymouth
William N. Davis	Seabrook	Seabrook
Mrs. Lillian L. Gordon	Warren	Warren
Ira E. Hanson	North Woodstock	Woodstock
John M. Lamb	Hinsdale	Hinsdale
George F. Brown	Box 34, Boscawen	Boscawen

Although in operation nearly four years with but 16 duly appointed tree wardens in 1928, it is the belief that a substantial beginning has been made. The machinery for progress is established. The number will no doubt increase from year to year and the importance of the position will become more generally understood and appreciated as time goes on. The Forestry Department hopes to be able to work with these wardens and assist them in understanding their duties and appreciating the opportunities for future service as well as to prevent interest once started from being allowed to lapse. Local organizations and citizens should make it their business to create public interest in tree warden work, help to secure tree wardens where they are needed and see that money is made available for work which should be done. As the idea of saving desirable roadside trees increases and trees and roadside strips of land in time become the property of towns in accordance with the roadside tree law, the work of tree wardens will increase in value and importance. Tree wardens could very properly be placed in charge of town forests under local town forest committees now functioning in a considerable number of New Hampshire towns. The prospects for increased interest by the public and for real service by tree wardens are genuine and not to be ignored.

FORESTRY EXTENSION

Farm Forestry

K. E. BARRACLOUGH, *Extension Forester*

The New Hampshire Extension Service in Co-operation with the U. S. Department of Agriculture through its field workers undertakes the task of carrying the best practices in agriculture and homemaking to the door of the farm

RELEASING AND WEEDING OPERATIONS BY MEMBER 4-H BOYS CLUB

Photo by Barraclough

homes in the state. Special emphasis is placed on teaching the boys and girls. Of the 650,000 4-H Club Members of the country, 5,000 are in New Hampshire. Over 500 of this number are enrolled in 4-H Forestry work. New Hampshire was one of the first states to start Junior Forestry work and has always been one of the leaders in this project. Most 4-H Forestry members live on farms where there are woodlots to improve and waste land available for planting. In the towns of Hopkinton, Jaffrey, Warren, Kingston, Durham, Wakefield, and Newington, 4-H members have

improved the town forests by planting pine and cutting weed trees. With plenty of land to work on, and with a natural interest in things that grow, boys and girls are interested in farm forestry.

The 4-H Forestry project is divided into five divisions namely, wood and leaf identification, seed collection and nursery practice, planting, woodlot improvement, and woodlot management. The most popular divisions are wood and leaf identification, planting, and wood lot improvement. The younger members usually undertake the first division, while members of all ages, (9-18) do the others. The boy or girl who plants is required to set out 500 trees to complete the project. The 4-H members who buy 500 trees, often with their own money, and plant them usually on rough stony land deserve much credit. Last year 40 members in one county were encouraged to plant by having offered to them 250 trees if they would plant the required 500. The result was that over one-third of all the trees planted in the state by boys and girls were planted in this one county.

In the woodlot improvement division 4-H members often do a man's work in the woods. The younger members are required to improve ¼ acre, the older members ½ acre, and members 18 years of age one acre. The job is usually releasing white pine from gray birch, pruning or thinning white pine or a combination of these operations.

This year (1928) 533 boys and girls enrolled in the 4-H Forestry project. They planted 139,025 trees, improved a total of 219 acres, and made 124 wood collections. During the last three years forestry members have planted 357,175 trees, improved 518 acres, and made 285 wood collections.

While much attention and effect have been given to the 4-H Forestry work, adult projects have received a fair share of attention. Last year a special effort was started to induce woodlot owners to free suppressed white pine from overtopping weed trees such as gray birch. News articles on the subjects appeared in local papers, circular letters

were sent out and several field demonstrations were given. Individual woodlot owners were visited and given information and offered encouragement. In five counties, Cheshire, Hillsborough, Rockingham, Strafford, Belknap, and Carroll where this project was stressed, there is record of 95 farmers who cut gray birch from over white pine on a combined area of 406 acres. To be effective this project must be continued over a period of years.

Farmers in the northern part of the state sell balsam and spruce for Christmas trees to buyers at the rate of 15 cents a bundle, three to six in a bundle. Since much of the cutting is in the form of pasture improvement, the use of these trees will have little or no effect on the future pulp supply. It would be possible for farmers to secure a much better price for Christmas trees by joining together in small groups and retailing the trees directly in the New England cities.

Twelve farmers who work their woodlots as a crop to yield an income periodically are keeping records of the costs and receipts. Some very valuable figures are being secured and in a few years the figures can be used in urging the practice of farm forestry.

Five sawmill demonstration meetings have been held during the last two years. The purpose of these demonstrations has been to show the importance and economy of growing quality logs, and manufacturing good lumber.

Farm woodlot visits, news articles, letters, lectures, general meetings, and demonstration plots help stimulate an active interest in farm forestry. Farmers living within easy hauling distance of permanent wood using centers, are usually more interested in woodlot management than those living away from good markets.

Forestry Extension in Coos and Grafton Counties

C. S. HERR, *Assistant County Agent*

A large proportion of the nearly 4,100 farms in Coos and Grafton Counties of New Hampshire have a woodlot or at

least, they include some waste land which could very profitably be occupied in the production of timber. The Forest Resource Survey of 1924 shows that only 291,000 acres are devoted to crops and pasture while 1,937,000 is growing timber or is potential forest land. Here it would seem that the growing of wood is a profitable and going business and perhaps, if the facts were known, could be made even more so. Our farm woodlot survey which is now in progress will show to what degree these heterogeneous bits of timber contribute to the general farm income. Every possible phase of farm forest product will be studied including saw logs, pulpwood, harvesting of Christmas trees, fuelwood, maple syrup and sugar production, and the collection of tree seeds for nursery purposes.

In addition to the part which the woodlot plays in the general farm income we will study the present logging methods, the effect of the woodlot on labor turnover, farm income received in proportion to the labor and area utilized, present markets, quality of wood products, availability of time, help and equipment, markets, stumpage prices, yields per acre, and present forestry practices.

After we have completed the survey, asked all these questions and studied their answers, we expect to know the problems involved in the growing and utilization of wood products produced in the farm woodlots of northern New Hampshire. We will also know something of stumpage value trends, the effects of competition from other forest sections, the possibilities of developing new markets, what improvements are needed in logging methods, what silvicultural and protection practices should be applied and something of the future role of the farm woodlot in land management.

The Christmas Tree Industry

C. S. HERR, *Assistant County Agent*

It seems likely that the Christmas tree came to America first by German immigrants (or possibly even by the Hessian soldiers of the Revolution) and found a ready welcome

in New York with its strong Dutch traditions. At any rate, the first Christmas trees sold in America, were brought from the Catskills to New York by an enterprising woodsman named Mark Carr in 1851. Before that people had cut their own trees. Mark shrewdly thought that there must be people who wanted trees but could not go after them, and so brought down two sledge-loads of firs and opened his market on Vesey Street. They sold so fast that people were bidding for those left. You may be sure he came next year and the next.

This year there were used in North America about ten million Christmas trees at an annual cost of $5,000,000. Figures furnished by the railroads show that New Hampshire exported this season about 800,000 trees (400 carloads) or very nearly one tenth of the total number used. New York, Boston, and Philadelphia claimed the greatest number although trees were shipped as far west as Chicago and Kansas City.

Very commonly the question is raised as to whether the cutting and use of these trees for Christmas purposes is not a great waste and whether steps should not be taken to discourage or prohibit it. It is doubtful even if pure economic considerations would lead to the abandonment of the Christmas tree custom. Trees are for use and they are both a natural resource and a crop, and their primary purpose is use and revenue to their owner. Certainly there is no other use to which they can be put that would contribute so much to the joy of man as their use by children on this one great holiday of the year. To argue that it is an economic sin to cut down a young growing spruce for the few hours of use it will have as a Christmas tree, is foolish when it is considered that even if left to commercial maturity of fifty years, its final utilization may be possibly nothing nobler than a few copies of a comic paper, out of which two or three individuals will pick out the half dozen items that amuse them and then throw it aside. Only the real value should certainly be received and it is certain that

many owners do not appreciate the value of the young forest tree or else are guided by too shortsighted a policy. Without a doubt the practice is abused in minor ways. In general, however, the cutting of a Christmas tree, whether for private use, local sale, or export, is a sound and legitimate business operation.

A large proportion of the Christmas trees which are harvested in New Hampshire are cut from pasture lands on which they are encroaching or from land which would be cleared up in the ordinary course of farm improvement. The trees would be cut in any event. A market for them gives the owner some return for his labor if nothing more. It is not by denying ourselves the wholesome pleasure of having a bit of nature in our homes at Christmas that we shall preserve our forests, but by learning how to use them wisely and properly.

Even in Germany where the forests are operated on the closest margin of utilization, the cutting of trees for use at Christmas time is permitted and even encouraged. The trees which are harvested are however marked so that no destructive cutting is done. There is scarcely a hut in Germany which does not enjoy a Christmas tree.

Thinning a natural coniferous stand for Christmas trees and at the same time benefiting that forest by the silvicultural value of the operation, has a very limited application. The products of such thinnings cannot be the Christmas trees of commerce; for these demand well-shaped trees with sturdy dense foliage, the very trees in fact that would be chosen to remain and make up the forest. In short, the only suitable material for good Christmas trees that could be cut as improvement thinnings from the forest in a large quantity, without detriment to future timber production would be balsam fir.

Another source of trees not made use of to any extent, lies in the tops of spruce and balsam trees cut in the course of logging operations. A high percentage of the tops of mature trees of these species are found in an ideal condition

of form and density and can be cut to any size desired. If the tree be felled with due care to the protection of its top, no great damage would result. This method is available to farmers and jobbers cutting pulpwood or sawlogs in November and December, and is suitable for rail shipment to the cities. Millions of possible Christmas trees are lying freshly cut in the woods every Christmas time, and wasted.

The movement to plant our own Christmas trees is an excellent one and should be encouraged. Each family can grow one of its own, not in competition with the marketable trees which are placed in the homes of the country once a year, but as an ornament to the lawn. For this purpose native spruce and fir may be used. The Japanese Nikko fir, a new variety in the United States, is also recommended. Decorated with colored lights the lawn Christmas tree is a thing of beauty. Aside from the holiday sentiment, the Christmas tree will perform an important function if it adds to the interest of the public in trees generally.

It is a pretty safe prediction that the Christmas tree of the future will be grown in nurseries near the large centers of consumption. For the enterprising farmer to whom another cash crop may appeal, with land to spare, this new side line can be made a sound business undertaking. The present output of trees in New Hampshire would require approximately 800 acres planted annually.

The work of cutting begins for the most part in October. The cut trees are arranged according to sizes, their tops wrapped with twine to save space and then tied up in bundles of from two to eight trees. They are then hauled to the railroad in hayracks and loaded on platform cars, for their long journey to the city. A tree on the city markets may bring anywhere from 25c to $50, depending upon its size and symmetry. Small trees from 5 to 6 feet tall are sold for 75c to $2.00. There is very little profit in the business for those who furnish the trees. Those selling the trees look upon them as a gift of nature, and in selling them, consider only the labor of cutting and hauling and not the expense required to grow the trees. The average price

paid during the last season was about six cents apiece or a stumpage of 3 or 4 cents. When the market is not glutted the dealers make large profits but "All is not gold that glitters," because when the supply exceeds the demand they are apt to suffer losses and frequently resort to the destruction of many trees in order to keep up the price.

Forestry means use of the forest which actually places the Christmas tree industry on a going basis. It is a side line which we must encourage in this state since it brought in this year about $65,000 in cash not to mention the employment it gave to men and teams. Certain very rigid restrictions must be imposed upon the jobbers doing the cutting if our woodlands are to continue producing trees. A lot if handled properly can be culled over lightly every several years.

In the future we will have to compete with Canadian grown trees. Several shiploads of Newfoundland trees were sold on the Boston markets this past season. They will have greater transportation charges in addition to a 10% duty charge.

Owners selling trees from their land should keep the following points in mind when making agreements with jobbers:

1. If a thinning is to be made, go through the woodland carefully, pick out and mark the most vigorous specimens of trees. These should be allowed to remain to form the mature stand of timber.

2. Trees should be cut below the green limbs and close to the ground; otherwise those limbs remaining will continue to grow, causing a greatly deformed tree.

3. Under no circumstances allow the felling or bending over and cutting of large trees where only the tops would be utilized.

4. The miscellaneous scattering of brush over the cutting should not be permitted because it will later constitute a fire danger.

5. Trees are yearly becoming more difficult to procure and prices are very likely to be on the increase.

STATE APPROPRIATION ITEMS

July 1, 1926 to June 30, 1927

	Appropriation.	Expenditures.
Salary of Forester	$3,000.00	.....
Transferred from "Prevention of Fires"	250.00	$3,250.00
Field Assistants	2,500.00	2,500.00
Clerical Expense	4,425.00	.....
Transferred from "Prevention of Fires"	485.00	4,910.00
Traveling Expense	1,000.00	1,000.00
Incidentals	1,800.00	1,800.00
Printing Report	800.00	799.98
Printing Blanks	1,200.00	1,200.00
District Chiefs	8,000.00	8,000.00
Lookout Stations	10,000.00	10,000.00
Conferences	1,000.00	997.00
Prevention of Fires	2,265.00*	2,265.00
Nursery	12,380.00	.....
Transferred from White Pine Blister Rust	2,000.00	14,380 00
State Lands	5,000.00	.....
Transferred from White Pine Blister Rust	5,000.00	10,000.00
Forest Fire Bills to Towns	7,500.00	7,500.00
Reforestation	4,000.00	4,000.00
White Pine Blister Rust	20,170.00**	20,169.79
Totals	$92,775.00	$92,771.77

* Transfers to "Salary of Forester" and "Clerical Expense" decreased "Prevention of Fires" $735.

** Transfers to "Nursery" and "State Lands" decreased "White Pine Blister Rust" $7,000.

July 1, 1927 to June 30, 1928

	Appropriation.	Expenditures.
Salary of Forester	$2,708.34*	$2,708.34
Clerical Expense	5,225.00	5,130.08
Field Assistants	2,500.00	2,491.67
Traveling Expense	1,000.00	.....
Transferred from "Salary of Forester"	541.66	1,541.66
Incidentals	1,000.00	1,000.00
Printing Blanks	1,200.00	1,200.00
District Chiefs	7,500.00	7,500.00
Lookout Stations	10,000.00	10,000.00
Conferences	1,000.00	1,000.00
Prevention of Fires	2,000.00	2,000.00
Nursery	13,731.00	13,731.00
Forest Fire Bills to Towns	5,000.00	4,844.76
Reforestation	2,000.00	.....
Transferred from Executive Department Funds	2,000.00	3,886.16
White Pine Blister Rust	20,000.00	19,360.12
Forest Fire Equipment	1,000.00	1,000.00
Totals	$78,406.00	$77,393.79

* Transfer to "Traveling Expense" decreased "Salary of Forester" $541.66

APPENDIX

Addresses at the

DEDICATION OF FRANCONIA NOTCH

September 15, 1928

W. R. BROWN, *Chairman, State Forestry Commission, presiding—*

We have come together today for a unique and memorable occasion. We are about to dedicate a great open air Park to posterity. New Hampshire has set her seal upon a Notch of lofty grandeur and wild beauty, upon whose riven side, stands out this age-old monument, the Old Man of the Mountain, whose benign face has looked down upon every epoch of our history with inspiration and blessing.

Why then is this Park and this dedication unique? In this, that New Hampshire here and now gives to all the world the best she has, in scenic beauty, typifying her spirit of hospitality, her offer of rest and inspiration to the weary, and the best use of God's great outdoors.

Unique, because in this Park, she pays a fitting tribute to her sons and daughters who have served the country with the steadfastness of these hills, paying a tribute that would seem most appropriate to them, dedicating it to service and beautifying of the lives of others.

"Lift up your eyes to the hills from which cometh your strength", is ingrained in every New Hampshire boy and girl, and in after life returning perchance to this spot, these men and women of New Hampshire have revived their souls at the sublime solitude and unchanging constancy of the Great Stone Face and the mountains of their youth.

As these scar-rived mountains, these shadowy woods and these gentle lakes are now to be preserved as a contribution to the scenic glories of America, it is fitting that for a

moment, note be made of the patriotic impulse and real idealism of the men and women who made this possible.

New Hampshire has been fortunate at all times in her choice of leaders, but never more so than when through the skilful guidance of Governor John G. Winant the bill was passed in the legislature of 1925 to purchase this Notch. To Governor Winant and the legislature of 1925 great credit is due for their vision and generosity. Speaking for the legislature, Governor Winant will tell you of the conception of the bill, its provisions and passage, and the first steps taken towards the acquisition.

HON. JOHN G. WINANT, *Governor of New Hampshire, 1925-1926*:—

Four years ago our legislature voted to acquire by purchase this property and to dedicate it as a memorial to the soldiers of New Hampshire who had fought to defend this state and "the several states" of the United States. This action was delayed due to insufficient funds. Since then wise counsel, the gifts of many people and the thoughtful generosity of a silent friend have made this possible. Seldom has all that is lovely in nature and unselfish in the memory of man been so perfectly united as in the dedication of this Memorial Park, given to perpetuate the memory of patriotic services and to be held in perpetuity as a playground for the people. All who stop here will gaze upon the Great Stone Face and enjoy the beauty of lake and fern and forest. To those who come in a holiday spirit may we wish them joy and cheer, and to the occasional pilgrim who comes with knowledge of those things for which men cared so much in this new land of ours that they gave life itself so that others might enjoy them—may he find here a sense of the permanency of all good things and go out with new strength and high courage to face a world that another looked out upon from a garden and a mountain top two thousand years ago seeing beyond Calvary this same world full of hope and faith and love.

CHAIRMAN W. R. BROWN:—

For 27 years a band called the Society for Protection of New Hampshire Forests has carried on in New Hampshire, striving to save the scenic forests and acquire parks and playgrounds for our people. To their former endeavors we already owe such splendid contributions as Crawford Notch, Monadnock Mountain, Lost River, Sunapee Lake, Waterville, and a score of smaller reservations, and to these now will be added Profile Notch. To them the State owes a lasting debt of gratitude. Especially to their devoted manager, Mr. Philip W. Ayres, who first conceived the idea of this purchase, and to their honored President, Mr. Allen Hollis, whose unremitting labor and tireless pursuance of negotiations carried the purchase through to a conclusion. Mr. Hollis will tell you of the Society's part in raising a sum equal to that appropriated by the legislature, of the generous gift of the late James J. Storrow and the securing of 1,500 contributors, many of them from far distant states.

ALLEN HOLLIS, *President, Society for Protection of New Hampshire Forests*:—

We have met today to dedicate to those who have served the state and nation this matchless expanse of mountains and lakes and forests. It is my privilege to represent the Society which has helped make this dedication a reality; and it seems appropriate to discuss some of the reasons for bringing into public ownership points of historic or scenic interest, of which Franconia Notch is probably the most notable in this state.

Our forefathers, who settled this country and founded its institutions, faced the problems of wresting a living from a hostile wilderness. As soon as they achieved security against famine and Indian wars, they sought and won their independence. Then followed nearly a century of material development, interrupted by the Civil War. The sixty-three years since Appomattox have wrought a transforma-

tion of our nation, which now leads the world in business and financial resources.

Throughout this history the prevailing policy until recently has been to scatter the public domain into private ownership. Here and elsewhere state and federal lands have been given away or sold for next to nothing. Within the lifetime of many of us the last of these mountain areas was sold for a few cents an acre.

While we may regret the lack of foresight of our predecessors we must recognize that in the light of their knowledge their action was logical. They could not foresee the need of saving some of our forests from destruction. They could not imagine the vast accumulation of wealth, the ever increasing pressure of industry, the crowding of our population into cities, and all the other causes for bringing to this region a multitude of people seeking rest and recreation. They could not visualize smooth highways carrying thousands of automobiles through these mountains.

Within recent years, hardly more than two or three decades, thoughtful people have begun to realize that some of the beauty spots must be safeguarded against the encroachments of civilization, as it is called. Places of historic significance must be preserved for the inspiration of future generations. Some of our forests, our lakes, our streams, our mountain tops must be saved and at the same time made accessible to those who wish to visit and enjoy them. In some measure men owe to nature an obligation of protection against their own improvidence.

Thus it is that everywhere have sprung up associations to preserve memorials of our great men and women, to care for sites of historic events, to protect the birds, the animals, the flowers, and most numerous of all, the forests. In this state it happens that our Society has undertaken some of these things; and when it was proposed to turn these valleys and mountain sides over to commercial logging operations, we were prepared to act—to lay the case before the people of the State and their representatives in the legislature and

countless others beyond our borders, who know and love our state. Without a word of criticism of the lawful owners of the property, everyone agreed that the time had come to make sure that this place, the very heart of New Hampshire, should not be despoiled by the axe and saw or ravaged by fire, that this shrine should not be violated by commercialism, that this Old Man should not be robbed of a worthy habitation.

The names of those who co-operated in this inspiring task are written in the history of our state. Governor Winant and the members of the 1925 legislature, who voted funds and authority; Governor Spaulding and his council, who completed the purchase; the Forestry Department, whose work of restoration appears on every hand; the Federation of Women's Clubs, which carried our banner to victory; all these are represented on the platform. My thought turns to those fifteen thousand men and women and children whose contributions matched the appropriation of a sovereign state, and enabled us to bring into public ownership, ultimately as a single unit, the entire area designated by the legislature, the Profile and the Flume.

Especially should I acknowledge, for the Society, and if I may, for the people of this state, the generosity and public spirit of Mr. Storrow, for many years our treasurer and frequently a large contributor to our funds. His expressed wish, faithfully observed by his family, placed at our disposal a large sum. We knew that using this fund for this purchase would have been approved by him, because he had volunteered a large contribution when the crisis came in 1925.

Another man, whom we might call our unofficial ambassador to France, responded most generously to our call. Edward Tuck, by this gift and his other important benefactions, gives conclusive evidence of devotion to his native state.

It would be a happy task to record the story of all the contributions, large and small, down to the children's dimes

and perhaps the widow's mite. Fifteen thousand people, promptly answering the appeal, actuated by loyalty, public spirit, generosity are a cloud of witnesses to the fact that unselfish patriotism is a living sentiment amongst our people. They nobly refute those who would decry our institutions and our times. The Old Man of the Mountain has helped his children to prove that they are worthy sons and daughters of a noble sire.

MR. BROWN:—

The women of New Hampshire showed from the start the greatest enthusiasm for this acquisition and through their Clubs succeeded in raising over 70% of the quota of the Society, and, as this Notch is peculiarly theirs, through its contribution to the grace, beauty and refinement of life, Mrs. George Morris, who had much to do with its acquisition, the President of the Federation of Women's Clubs of New Hampshire, will respond for them.

MRS. GEORGE H. MORRIS, *President, State Federation of Women's Clubs*:—

One of the most pleasing prerogatives belonging to the office of the Presidency of the New Hampshire Federation of Women's Clubs is that of being able to be the spokesman, not only for herself, but for thirteen thousand other women as well.

Naturally this is a privilege dear to the feminine heart. With this excuse for talking in mind, we might wander on at length in the labyrinth of speech-making were it not for the fact that your Master of Ceremonies in his invitation to the speaker to appear upon the program today, definitely limited the time to "five minutes, more or less". Hence, you have nothing to fear.

As spokesman for the Federation, I want to tell you at once how gratifying it has been, both collectively and individually, to have had a part in the success of the undertaking

for which these proceedings today are held in commemoration.

Certainly, it can be no secret that the New Hampshire Federation of Women's Clubs played a very real and important part in the final act that made it possible to acquire these thousands of acres, comprising Franconia Notch. It was the agent through which many of the donations were made.

This is said not in a spirit desiring thanks or recognition for the splendid women who have worked so untiringly for the cause, but humbly and reverently, grateful that their task was given them to do and that the women of New Hampshire did not fail their state.

If time permitted it would be interesting to tell how the Federation, when put to the acid test, was found to be so perfectly organized that under the most capable leadership of Mrs. Charles H. McDuffee, former President of the Federation, who in turn was co-operating with the Society for the Protection of New Hampshire Forests, its wheels were soon carrying it forward to the desired goal.

Quotas were assigned to each town in the state and eight District Chairmen, not only assumed the burden of overseeing the work in the towns in which there were federated clubs, but took upon themselves the oversight of unfederated towns as well.

It would be impossible to mention all who worked with enthusiastic zeal. Probably no one knows or ever will know all that was done, but we do realize that the women of the state responded to the call to arms whole-heartedly and with a singleness of purpose that never abated.

Encouragement soon came their way. They found other Federations, other organizations and other states responding to their call. Money came from the North, South, East and West in larger or smaller amounts. And it makes a striking commentary upon human character to note the manner in which many of these sums were given.

If time permitted we would see how the scholars in a not

very large country town gave by themselves between one hundred fifty and two hundred dollars,—

How one grandmother with her children and grandchildren, each contributing his dollar, bought quite a considerable grove of trees for the state,—

How the children from the Orphans' Home gave from their pennies over twenty dollars,—

How one town immediately went over the top four times,—

How in an unfederated town it being impossible to find an adult chairmen for the work, a young school boy took the task upon himself, and soon carried his town to victory.

All these things are interesting to hear about, but the culmination is reached today, when we stand here in the shadow of these trees with the"Grand Old Man" looking down upon us and dedicate this territory to,

"The Men and Women of New Hampshire
Who Served the Nation in Times of War."

And happy indeed is the New Hampshire Federation of Women's Clubs that it has been a contributing agent in the thing that has made this possible.

MR. BROWN :—

One of the first duties taken up by Governor Spaulding upon assuming office was the carrying on of the negotiations for purchase of the Notch started with the owners by Governor Winant.

For many months he worked hard and conscientiously to bring about this purchase in the happiest manner possible, coincident with the laws, the rights and preferences of everyone concerned, resulting at last in final success. It is most fitting that this occasion should perpetuate the memory of his administration and that this monument should be unveiled by him.

GOVERNOR HUNTLEY N. SPAULDING:—

I feel that this occasion means much to the State of New Hampshire. Rarely if ever, during my administration as governor, has it been my duty and my privilege to take part in an event of equal interest and importance.

These ceremonies stand for the final success of long continued efforts to bring those natural wonders of world-wide fame, Franconia Notch and the Profile, within public ownership and control.

The Profile is Nature's emblem of New Hampshire, maker of men; high ranking state in the proportion of sons and daughters whom she has reared and sent forth into the world beyond her borders to create and build and sustain this nation.

For untold centuries the Old Man has looked down from his eminence upon the tiny humans at his feet; red men and white men, hastening on errands of war and peace, of industry and recreation, through this great gateway of the mountains which we call Franconia Notch.

It is good to know that henceforth, we hope forever, these assets of the state are within the state's ownership and control, to be conserved and administered for the sole benefit of the people of New Hampshire and their visitors and guests from beyond our state borders.

I am glad and proud to think that this good deed was finally consummated during my term of office; the original appropriation having been made by the legislature during the administration of my predecessor, Governor Winant.

I think the members of the legislature of 1925, which made the necessary appropriation from the state treasury for this purchase, and of the legislature of 1927, which prolonged the life of that appropriation, made an intelligent, patriotic and far-seeing public service, for which they are entitled to great credit.

My own opportunity, for which I am very thankful, to have a slight part in this splendid work, came in the form

of assisting in the negotiations for the final, formal transfer of this property from private hands to public ownership.

And in this connection it gives me pleasure to say that the attitude of those in whom the title vested towards its acquisition by the state was at all times friendly, fair and public-spirited. The owners were men thoroughly acquainted with the situation; fully aware of the public necessity for preserving the Notch and the Profile; and as desirous as any of us of having this properly brought about.

But the state could not have met their just terms without aid to the public treasury from private sources. And this is where the Society for the Protection of New Hampshire Forests added another great service to the many which it had rendered previously to our state.

As a governor of New Hampshire, I wish to emphasize here today the debt which our commonwealth owes my predecessor of 28 years ago, Governor Frank West Rollins; who, in founding this society, performed perhaps the greatest of his many acts of distinguished public service.

Ably administered in his day and in this day, the Society is an appreciated agent in preserving the beauties and promoting the wealth and welfare of our state.

Many residents of sister states have joined with New Hampshire men and women in the activities of this society; notably, the late James J. Storrow of Boston, who added to his valuable official service to the society during his lifetime, a service now ably and generously continued by his son, a most generous bequest to the Society, which has been used for the purpose consummated here today.

But even with Mr. Storrow's splendid gift, with the appropriation from the state treasury and with the support of the Forest Society, there was still a broad gap to be bridged between the funds in hand and the price to be paid. This part of the problem was solved successfully by an appeal through the Society to the public, the result of which was most gratifying.

In fact, to me, one of the happiest features in the history

of this whole undertaking is the great number of those who have had a helpful share in it. From all parts of the nation, even to the Pacific coast, came messages of interest and tokens of substantial support for this great project. From foreign countries, also, came aid; notably a generous cheque from Paris bearing the signature of Edward Tuck, New Hampshire native, whose philanthropy is as wise as it is wide.

Every lover of nature, every person who sees God manifest in his wondrous works, has an interest in the achievement celebrated here today. I hesitate to make further special mention of any contributor or class of contributors; but I feel that I must not omit to say a word in appreciation of the work done by the women of New Hampshire, under the leadership of their State Federation of Women's Clubs, for this most worthy end. Their essential contribution proved once more, what needs no proof, that their united activity is a most potent influence for true progress on all lines.

Now that this unique domain is within the permanent possession and control of the state, it is of the utmost importance that it shall be ably administered, for its own best interests and for the greatest pleasure and profit of its new owners, the people. That this will be done, under the direct supervision of the State Forestry Commission, with the cooperation of the Forest Society, I have entire confidence. I am glad, and I know the whole force of the state forestry department is glad, of this great addition, not only to their duties and responsibilities, but also to their assets and their opportunities, as an important branch of our state government.

In the name and behalf of the State of New Hampshire, I unveil this tablet, in token of the public ownership of Franconia Notch, and its dedication as a living, yet eternal, monument, to the memory of those from New Hampshire who have served this state and nation in the wars in which our country has been engaged. As the Old Man of the

Mountain faithfully guards this highland pass, so they have helped to guard, in America and around the world, the cause of Liberty.

MR. BROWN:—

Following the unveiling, our patriotic citizen and orator, Judge James W. Remick, will accept this monument in the name of and speaking for all the men and women of New Hampshire who served the country in times of war. After the acceptance there will be a flag ceremony by the Littleton Post of the American Legion and an Historical Pageant of the saving of the Notch, given by the scholars of the Littleton High School, to which you are all cordially invited.

JUDGE JAMES W. REMICK:—

The tablet which His Excellency, Governor Spaulding, has just unveiled, on this historic occasion, and in this inspiring setting of sky, mountains, lakes, forests and streams, touched by the golden light and gorgeous colorings of autumn; with God in all His majesty; and the Old Man of the Mountain in all his rugged grandeur, looking down as approving witnesses, proclaims to the world in enduring bronze that, with funds appropriated by the Legislature of 1925 and 15,000 private donations secured by the Society for Protection of New Hampshire Forests, the State of New Hampshire has purchased this far-famed Franconia Notch —wonderland of America and the world—and on this, the 15th day of September, 1928, has dedicated it as a memorial park to the men and women of New Hampshire who served the nation in times of war.

As a general rule, memorials are made by man, occupy but little space, and are dedicated to some particular personage or group associated with some particular event. This memorial was made by God, comprises 6,000 acres, as beautiful and grand as the sun ever shone upon, and has been dedicated to the men and women of New Hampshire who have served the nation in any war, at any time, and

anywhere, whether on land or sea, or where "airy navies" grapple "in the central blue."

It is fitting that a memorial so vast and encircling in its dimensions should be thus inclusive in its objects. Accepting it in behalf of those to whom it has been dedicated, I can say without the slightest exaggeration that a memorial more unique and grand was never dedicated to men and women more noble and brave.

Were I to speak for the full twenty minutes allotted to me, I could not say more than that either to the credit of those who by their contributions of service or money have made this memorial possible, or in behalf of those to whom it has been dedicated, except to add that those to whom it has been here dedicated and their descendants forever, will gratefully cherish it and recall with pride this historic occasion.

To the everlasting glory of New Hampshire she was one of the original thirteen states of the American Union, and played a great and noble part in achieving the independence and laying the foundations of this republic. In the Old North Meeting House at Concord she cast the deciding vote for the adoption of the Federal Constitution, and to the making of the nation has contributed a galaxy of pathfinders, builders, warriors, orators, and statesmen, unsurpassed anywhere, at any time. Thanks to her noble sons and daughters, whose sacrifices for the nation this majestic memorial would keep in perpetual remembrance, her past, at least, is secure. It has been said that as wealth accumulates, men decay, and history warns against the degenerating effect of materialism upon the hearts and souls of men. The sentiment for the beautiful and the spirit of gratitude expressed by this memorial assures us that New Hampshire, in spite of her material development, is still mindful of the things of the soul. If we would make this Memorial Park more and more worthy of the men and women to whom it has been here dedicated, and more and more a spiritual and material asset of the state, we shall, as soon as reasonably

may be, remove the last vestige of commercialism and every contrivance of man which now mars its beauty and grandeur and lessens its appeal to the soul, and ever after safeguard it as God made it.

As the days and years go by may the crystal purity of its lakes and streams, the rich verdure of its forests, and the majesty of its peaks, inspire us to higher thinking and nobler living. May the Old Man of the Mountain and the beauty and grandeur over which he presides so majestically, do for us what the "Great Stone Face" did for the boy, Ernest, in Hawthorne's beautiful story of that name. Finally, may our lives justify the words of Daniel Webster, when he said: "Up in the mountains of New Hampshire God Almighty has hung out a sign to show that there he makes men." We shall thus doubly honor the noble men and women to whom we have here dedicated this memorial, so unique and grand, and makes assurance doubly sure that the future of the old Granite State will be even more glorious than its glorious past.

PORTABLE SAW MILLS REGISTERED IN 1927 AND 1928.

NAME OF OWNER	P. O. ADDRESS	TYPE
†**Acer Realty Company	Woodsville	Steam
*Ackerman, Arthur	Center Barnstead	Gasoline
*Ainsley, Achille	42 Mulberry St., Claremont	Gasoline
**Aldrich, W. L.	R. F. D., No. 1, Gossville	Gasoline
†Andrews, Austin D.	Granite	Steam
*Archibald, Ernest	Meredith Center	Gasoline
†Archibald, Joseph	Francestown	Steam
†**Armstrong, M. G.	Windham	Steam
†Ashland Lumber Company	Ashland	Steam
*Avery & Roberts	Milton	Gasoline
†**Babb, Walter H.	R. F. D., No. 1, Rochester	Gasoline
Bagley, James	Boscawen	Steam
†Bailey, Charles, Estate of	Hampstead	Steam
†Bailey Lumber Co.	Suncook	Steam
*†Banfill, William	Water Village	Steam
Bascom, Peter V.	20 Prospect St., Dover	Gasoline
†Bassett, Lewis F.	Salisbury	Steam
†Batchelder, W. M.	Hampton	Steam
**Belware, George	9 Preble St., Dover	Gasoline
†*Berry, Albert C.	Strafford Center	Steam
*Blain, Ralph P.	West Canaan	Gasoline
†Blake, Millard	New Hampton	Steam
Bliss, Charles E.	Warren, Mass.	Gasoline
†Blodgett, F. E. & Son Co.	Concord	Steam
†**Bosse, Paul	Conway	Steam
Bourdon & Corliss	Northwood	Gasoline
†Bowles, Charles M.	Canaan Center	Steam
†**Boyd, F. T.	Farmington	Steam
†Brooks, Clarence A., Estate of	Winchendon, Mass.	Steam
†Brown, John A.	Barrington	Steam
†Brown, John A.	Barrington	Gasoline
Brown, Woodbury J.	Salem Depot	Steam
†Burleigh, E. H. & F. A.	Meredith	Steam
†Burnham, A. L.	Goffstown	Steam
†Call, Everett	Contoocook	Gasoline
**Carleton, Geo. O., Agent	Mont Vernon	Steam
†*Carpenter, Jesse N.	Newmarket	Steam
†Carr, Alvah	Hill	Steam
†Carr, Alvah	Hill	Steam
Carson, Fred D.	Hillsboro	Steam
†Carter Brothers	Tilton	Steam
*Chaffee Brothers Company	Oxford, Mass.	Steam
Chaffee Brothers Company	Oxford, Mass.	Steam
Chamberlin, John B.	New Durham	Gasoline
**Chase, Arthur F.	Gilmanton Iron Works	Gasoline
†Chase, Fred H.	Contoocook	Steam
*Chase, H. Dewey	Orford	Gasoline
†**Chase, Irving N.	287 Main St., Amesbury, Mass.	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
†Chase, S. R.	South Berwick, Me.	Steam
*Chick, Sumner	Woodman	Steam
†Christianson, Martin	R. F. D., No. 3, Concord	Gasoline
†**Clark, Lester	College Road, Manchester	Steam
†*Clark, Walter E., Lumber Co.	Franklin	Gasoline
†Clayton & Ward	Madison	Gasoline
†Colbert, James H.	Madison	Steam
†Colby, Joseph G.	Boscawen	Steam
†Collins, Raymond	Somersworth	Gasoline
†Concord Lumber Company	Concord	Steam
*Coolidge & Company	Bristol	Gasoline
†Coutu, Octave	121 Wilson St., Manchester	Gasoline
†Cross, Frank G.	Pittsfield	Gasoline
*Cuddihee, James	New Boston	Steam
†Cutter, V. A.	Ashuelot	Steam
†Davis, Freeman R.	248 Prospect St., Manchester	Gasoline
**Davis & Rogers	Suncook	Gasoline
†Deering & Hill	Pittsfield	Gasoline
†Doolin, Ira F.	West Canaan	Steam
Dow, Ausbrey N.	Ossipee	Steam
†Dow, John A.	Pittsfield	Steam
†Drake, Harvey W.	Barnstead	Gasoline
†**Drew, John	South Berwick, Me.	Gasoline
†Dubia, C. R.	Contoocook	Gasoline
†Dunlap, W. B.	R. F. D., Andover	Gasoline
†Duston, F. K.	Westville	Steam
†Ellison, Lewis H.	Durham	Steam
†Ellison, W. A.	R. F. D., No. 5, Dover	Steam
†Ellsworth, Elmer S.	Penacook	Steam
†**Emerson, Chas. H.	Enfield Center	Steam
Emerson, Chas. H.	Enfield Center	Steam
**Emery, Chas. M.	Tilton	Steam
†Farrington, A. W.	1047 So. Main St., Athol, Mass.	Steam
**Farrington & Webb	North Fryeburg, Maine	Steam
†**Fernald Brothers	Nottingham	Steam
*Fitch Motor Company, Inc.	Keene	Steam
†Flanders, Chas. H.	Bristol	Gasoline
†**Flanders, Chas. H.	Bristol	Steam
†**Flanders, Fred W.	Hopkinton	Steam
**Flanders, Fred W.	Hopkinton	Steam
*Flanders, Rodney	Enfield	Gasoline
†Fleming, John A.	Hillsboro	Steam
†Folsom, Frank	Raymond	Steam
†Ford, C. A.	Canaan	Steam
†**Fortin, Peter	Hooksett	Steam
Fortin, Peter	Hooksett	Gasoline
†Foss, C. A.	Northwood Center	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
†Foss, C. E.	Dover	Gasoline
†**Freeman, Clair W.	Haverhill	Steam
Freeman, Ralph W.	Hinsdale	Steam
†French, B. W. & J. A.	R. F. D. No. 7, Concord	Steam
†French, L. E. & Son	Center Barnstead	Steam
†French, Carlton L.	South Tamworth	Steam
*Fuller, Geo. S.	50 East Haverhill St. Lawrence, Mass.	Steam
†Gardner, Walter C.	Springfield	Steam
†Gerrish, Edwin C.	Penacook	Gasoline
**Gibson, C. E.	South Ryegate, Vt.	Steam
*Gibson & Spaulding	Plymouth	Steam
†Gillingham, Geo. E.	Chester	Gasoline
*Gilman, Ray	East Weare	Gasoline
Goodnow, Elmer P.	Brattleboro, Vt.	Steam
†Goodrich, Frank	Berwick, Me.	Gasoline
†Goss, W. C.	Henniker	Gasoline
†Grau, James A.	Dublin	Gasoline
†**Graves, Ross M.	Moultonboro	Steam
*Green, Frank E.	R. F. D. No. 1, Fitchburg, Mass.	Gasoline
*Greenleaf, Horace T.	Holderness	Gasoline
†**Guilmet, Napoleon	Farmington	Steam
†**Hall, Alpha S.	Hancock	Steam
*Hall, Arthur G.	Fryeburg, Me.	Gasoline
†**Hammond, Annie R.	Canaan	Steam
*Hammond, Ronald C.	Canaan	Steam
Hanna, Geo.	Danville, Vt.	Steam
†Hancock, H. W.	Belmont	Steam
†**Harrington & Beck	Alstead	Gasoline
†Hart, D. J., Box Company	Marlboro	Steam
*Harvey, A. M.	Berwick, Maine	Steam
*Harvey, A. M.	Berwick, Maine	Steam
†Hatch, H. A.	Bellows Falls, Vt.	Steam
Heath, Chas. H.	Hampstead	Steam
*Hill, James W.	Box 95, Barnstead	Gasoline
†**Hillsgrove, W. J.	Dover	Gasoline
†Holmes Brothers	Gerrish	Steam
†Holmes, D. L.	Route No. 16, Penacook	Gasoline
†Hood, H. A. & B. A.	Richmond	Steam
†Hopkins, Frank C.	Keene	Steam
†*Howard, B. C.	Marlow	Steam
†**Howe Lumber Company	Marlboro, Mass.	Steam
†Howe, Earl A.	224 Elm St., Claremont	Gasoline
Howe, Geo. L. & Son	R. F. D. No. 3, Tilton	Steam
*Hoyt, C. F. & Son	Enfield Center	Steam
†Huckins, S. O.	Center Ossipee	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
Ingalls, L. L.	Groton	Steam
†Jaquith, John A.	West Canaan	Steam
†**Jaquith, John A.	Tilton	Steam
*Jenkerson, W. B.	R. F. D. No. 3, Wentworth	Steam
†Jemery & Palmer	Alexandria	Steam
†Jones, A. H.	Belmont	Steam
†Jones, J. Gilman	Berwick, Maine	Steam
†Joslyn, A. C.	Hinsdale	Gasoline
**Jones, Harry E.	Alton Bay	Gasoline
*Jones, John C.	East Lebanon, Me.	Steam
†Kelley, Asa B.	Union	Steam
†**Keniston, John	Plymouth	Gasoline
**Kenyon, Chas. E.	West Canaan	Steam
†Kimball, Forest G.	55 Carpenter St., Manchester	Steam
Kirkpatrick, F. A.	Conway	Steam
**Knight, Arthur J.	Fitzwilliam	Gasoline
†Knight, David O.	R. F. D. No. 2, Newport	Steam
†**Lacasse, Edmond	Bemis	Steam
†**Lacasse, Edmond	Bemis	Steam
LaCourse, Peter C.	Lyme	Steam
†Ladd, Louis P.	Epping	Steam
†Langdell Lumber Company	Manchester	Steam
†Langdon Lumber & Garage Co.	R. F. D., Alstead	Gasoline
*Langevin, A. & J.	Bartlett	Steam
Lary, A. C.	Canaan	Gasoline
Lary, A. C.	Canaan	Gasoline
†**Layne, Benton E.	R. F. D. No. 5, Dover	Steam
Layne, Benton E.	R. F. D. No. 5, Dover	Steam
†Leathers, Geo. A.	Ward Hill, Mass.	Gasoline
†Lenz, John	Reed's Ferry	Gasoline
†Leroux, D. W.	Contoocook	Steam
*Lisbon Manufacturing Co.	Lisbon	Steam
†Little, Arthur H.	Westville	Steam
†Little, Ben P.	R. F. D., No. 1, Warner	Gasoline
Littlefield, Chas. H.	Berwick, Me.	Steam
Livingston, A. O.	Meredith	Steam
†Locke, Clarence B.	Rochester	Gasoline
*Lord, John H.	Concord, Mass.	Steam
Lorden, D. F.	21 Knight St., Milford	Gasoline
†**Lundberg, Frank E.	Salem Depot	Steam
†Marden, Clement	Ashland	Gasoline
**Marcoux, Fred	Alton	Steam
*Martell, Joseph	21 Wall St., Claremont	Gasoline
†Mason, William O.	New Boston	Gasoline
†**McAllister, C. O. & C. A.	R. F. D. No. 1, Warner	Gasoline

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
†**McCaffrey, Thos.	1008 Elm St., Manchester	Steam
†McDuffee, Horace, Estate of	913 Page St., Manchester	Steam
†McKenzie, Edward J.	Franconia	Gasoline
†McKinley, R. E.	Auburn	Gasoline
†Melendy, C. F.	Wilton	Steam
†Meredith Grain Company	Meredith	Steam
†Meredith Grain Company	Meredith	Gasoline
†**Merrill, A. D.	West Thornton	Steam
*Merrill, A. D.	West Thornton	Steam
†**Merrill, C. N. & Son	Bristol	Gasoline
Merrill, D. A.	Brownfield, Maine	Steam
†Merrill, Geo. W.	New Boston	Steam
†**Mills, Arthur E.	West Hampstead	Steam
†Mills, Arthur E.	West Hampstead	Steam
†Moore, John A.	4 Everett St., Dover	Gasoline
†Morse, Edgar L.	Woodsville	Steam
†Morse, M. Wallace	Henniker	Gasoline
*Moulton, A. C. & Son	Plymouth	Gasoline
†Muldoon Brothers	Pelham	Steam
†Nelson, Ernest	Eaton Center	Steam
*Nelson, Harry F.	Center Ossipee	Gasoline
*New Hampshire-Vt. Lumber Co.	West Stewartstown	Gasoline
*Nutting, Anson	Townsend, Mass.	Gasoline
Parker, E. E. & Perham	R. F. D., No. 1, Reed's Ferry	Steam
†**Parker Young Company	Lincoln	Steam
†Parker Young Company	Lincoln	Steam
†**Parshley, H. K.	167 Washington St., Dover	Steam
*Pascoe, William H.	West Ossipee	Gasoline
†Patenaude, Walter C.	Henniker	Steam
†Patenaude, William E.	East Weare	Steam
†Pattee, Fred L.	West Canaan	Steam
*Penniman, W. F.	Center Harbor	Gasoline
*Perkins, Ralph C.	Piermont	Gasoline
†Perley, John A.	Goffstown	Steam
*Pherson, Charles	Amherst	Steam
*Philbrick, A. E.	93 B Church St., Laconia	Steam
**Philbrick, A. E.	Alton	Steam
†**Philbrick, A. E.	Lakeport	Gasoline
Pierce, W. H.	Lyme Center	Gasoline
†Pitman, John W.	Bristol	Steam
*Plastridge, F. C.	New Hampton	Steam
†Pluff, H. C.	Canaan	Steam
*Plympton, Fred H.	Box 86, Conway, Mass.	Steam
†*Pratt, H. B.	Kezar Falls, Me.	Steam
†Prescott, C. W.	Winchester	Gasoline
†Putnam, Fred M.	R. F. D., No. 3, Box 49, Peterboro	Steam

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
†Rand, O. H.	c/o Ralph S. True, Route No. 3, Chester	Steam
†Randall, Isaac	Hampstead	Steam
†Randall, Maurice I.	Hampstead	Steam
†Raney, Don	Peterboro	Steam
†Ray, Paul J.	Box 219, Hillsboro	Gasoline
**Renfrew, J. S.	Plymouth	Steam
**Rhodes, Bert	Tully, Mass.	Steam
Richardson, E. E.	92 Island St., Keene	Gasoline
†Roberts, Shirley	Goffstown	Steam
*Robertson, Fred	Box 159, Farmington	Gasoline
Robbins Lumber Company	Springfield, Mass.	Steam
*Rogers, A. H.	Canaan	Steam
†Rust, Horace	Wolfeboro	Steam
*Ryder, Frank L.	Hillsboro	Gasoline
†St. John, Joseph	Conway	Steam
†Sargent's, Geo. W., Sons	Merrimac, Mass.	Steam
*Sargent, W. L.	Newport	Steam
*Saunders Brothers	Box 16, Cumberland Mills, Me.	Gasoline
†Sawyer, Charles W.	Peterboro	Steam
†**Sawyer, Charles W.	Medfield, Mass.	Gasoline
†**Scott, Dean R.	Winchester	Gasoline
†**Seaver, E. E.	New Hampton	Gasoline
Seavey, S. C.	Plymouth	Steam
**Seavey, S. C.	Plymouth	Steam
**Seavey, Walter H.	Kearsarge	Gasoline
†Shaw, Albert H.	Gilmanton Iron Works	Steam
†Shaw, M. H.	Hinsdale	Steam
*Sherburne, Seth W.	Dover	Gasoline
†Simms, Clifton	West Ossipee	Steam
**Simms, Clifton	West Ossipee	Gasoline
*Simonds & Ogden	29 South St., Concord	Gasoline
†Skofield, F. T.	New Boston	Steam
†Smart, C. E. & H. P.	Center Ossipee	Steam
†Smith, Herman M.	Goffstown	Steam
†Smith, Horace H.	Farmington	Steam
†Smith, Joseph F.	Meredith Center	Gasoline
†Smith, Karl B.	Royalston, Mass.	Steam
†Spalding & Yeaton	R. F. D. No. 1, Plymouth	Steam
†Starkey, W. S. & B. L.	Westmoreland	Steam
†Stearns, D. P.	Charlestown	Gasoline
*Stebbins, R. E.	South Sutton	Steam
†Stevens, John H.	Alfred, Me.	Steam
†Stone, Charles W.	Gilmanton Iron Works	Gasoline
†**Stone, D. S.	Woodsville	Steam
†Stone, D. S.	Woodsville	Steam
Stow, C. D.	Lyme Center	Gasoline

PORTABLE SAW MILLS REGISTERED—*Continued*

NAME OF OWNER	P. O. ADDRESS	TYPE
†Taft, W. A.	Washington	Gasoline
*Tappan, George	West Newfield, Me.	Steam
**Tapply, Chas. E.	9 Ross St., Fitchburg, Mass.	Steam
*Tarbox, Allen	Glencliff	Steam
*Taylor & Cilley	Manchester	Steam
†**Thompson, Freeman	Dover	Gasoline
*Thompson, Freeman	Dover	Steam
**Thorpe, F. E.	Lisbon	Steam
†Thurston, M. L.	Exeter	Steam
*True, E. C. & J. A. Noyes	Chester	Gasoline
†Tufts, Edward P.	Route No. 1, Hooksett	Gasoline
†Twombly, Wm. M.	Center Conway	Steam
†Vadney, I. H.	Francestown	Steam
†Waldron, Homer J.	North Wakefield	Gasoline
†**Walker Brothers	North Charlestown	Steam
†Walker, James B.	Newmarket	Gasoline
**Walker, Lewis A.	Newmarket	Steam
Watson, Chas. H.	R. F. D. No. 4, Laconia	Gasoline
†Weare, E. W.	Meredith Center	Steam
†Weeks, Raymond A.	East Wakefield	Steam
†**Welch, Sidney	South Hiram, Me.	Steam
†**Wentworth, A. S. & Sons	Denmark, Me.	Steam
†Wheeler, Frank A.	Barnstead	Steam
†Wheeler, Scott M.	229 Front St., Manchester	Steam
†Whipple, Elmer E.	Winchester	Gasoline
†Whitcher, H. P.	Strafford	Gasoline
Whitehouse & Taylor	South Effingham	Steam
†Whitney, F. Ralph	Winchester	Steam
†Whittier, H. F.	Henniker	Steam
†Wilkins, C. S.	Keene	Steam
†Willey, George F.	Canaan	Steam
†*Willey, W. H.	Wolfeboro Falls	Steam
†Wilson, Alpha T.	Peterboro	Gasoline
†Wilson, Alpha T.	Peterboro	Steam
*Wood, B. C.	West Upton, Mass.	Steam
†**Wood, Perry	Manchester	Steam
*Woods, William	Washington	Steam
†Yeaton, William H.	R. F. D., Pittsfield	Steam
†York, E. J.	Dover	Steam
†Young, Lendell A.	Rochester	Gasoline
†Young, Lendell A.	Rochester	Gasoline

No index. Indicates registration in 1927 and 1928.
* Indicates registration in 1928 only.
** Indicates registration in 1927 only.
† Indicates registration previous to 1927 and 1928. Refer to biennial report of 1925—1926.

WOOD USING INDUSTRIES, STATIONARY SAW MILLS AND RETAIL LUMBER DEALERS

BELKNAP COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Boulia-Gorrell Lumber Company	Lakeport	Box Shooks and Retail Lumber
Brown, R. C.	Barnstead	Wood Heels
Chase & Veasey	Lakeport	Veneer Boxes and Lumber
Cook Lumber Company	Laconia	Saw Mill, Box Shooks and Retail Lumber
Drake, E. B., Estate	Barnstead	Saw Mill and Retail Lumber
Emery, Charles M.	Tilton	Saw Mill, Boxes, Shooks and Retail Lumber
French, S. E. & Sons	Center Barnstead	Wholesale and Retail Lumber
Gordon & Plaistridge	New Hampton	Saw Mill
General Heel Company	Bristol	Wood Heels
Howe, C. G.	Sanbornton	Saw Mill
Hutchinson & Hutchinson	Bristol	Picker sticks
Lapham, Albert H.	Alton	Toys and Novelties
Leighton, J. P.	Center Harbor	Saw Mill
Maloon, 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
Smith, C. Sherman Inc.	Bristol	Retail Lumber
Wells & Allard	Bristol	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

CARROLL COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Chandler, Arthur W.	No. Conway	Retail Lumber
Clow, S. W.	Wolfeboro	Boxes and Shooks
Carroll County Lumber Co.	Center Ossipee	Novelties and Miscellaneous
Conway Wood Heel Company	Conway	Wood Heels
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
Hoyt, Edwin E.	East Madison	Saw Mill and Retail Lumber
Huckins, S. O.	Ossipee	Saw Mill and Retail Lumber
Hutchins, Frank	Wolfeboro	Excelsior
Jackson Brothers	Conway	Clothespins and Novelties
Kearsarge Pegs Company	Bartlett	Pegs
Kelley, Percey	Moultonboro	Saw Mill
Kennett, Frank E.	Conway	Wholesale and Retail Lumber
Laskey, A.	Union	Saw Mill
Libbey, W. H.	Intervale	Planing and House Finish
Livermore Mills	Livermore	Wholesale and Retail Lumber
Lord, Wm. H.	Union	Excelsior
Lucy, Arthur O.	No. Conway	Saw Mill
Mason & Moulton	Ossipee	Wholesale and Retail Lumber
Milliken & Merrow	Freedom	Chair Stock
Mudgett, H. H.	Intervale	Saw Mill 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 and Tables
South Tamworth Industries	South Tamworth	Saw Mill, Toys and House Finish
Tappan, W. S.	Sandwich	Saw Mill
Twombly, W. M.	Conway Center	Saw Mill
Vinall, Geo. W.	Sandwich	Saw Mill

CARROLL COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
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
Bean & Symonds	East Jaffrey	Saw Mill, Box Shooks and Retail Lumber
Beauregard, George	Marlboro	Saw Mill
Beaver Mills	Keene	Saw Mill and Cooperage
Beverstock, O. D. Company	Keene	Hoops and Rims
Braggs, L. F.	Alstead	Saw Mill
Burdett Chair Co.	Keene	Chairs and Brush Handles
Carey Chair Manufacturing Co.	Keene	Porch Chairs
Cleaves, S. H. & Son	West Rindge	Saw Mill, Baskets and Retail Lumber
Colburn, S. J.	Walpole	Saw Mill
Currier, M. A.	Alstead	Wood Working
Damon, Walter S.	Rindge	Brush Handles and Retail Lumber.
Damon, Jonas, Estate	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
Joslyn, C. M.	Chesterfield	Saw Mill

CHESHIRE COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Keene Screen Company	Keene	Screens
Keene Chair Company	Keene	Chairs
Keene Woodenware Company	Keene	Pails and Saw Mill
Lane, C. L. Co.	East Swanzey	Pails and Buckets
Lane Chair Company	East Swanzey	Chairs
Lawrence Box Company	Keene	Boxes
Leach Mfg. Co.	Hinsdale	Wood Working
Lempster Queen Clothespin Mfg. Co.	Marlow	Clothes Pins
Lynnwood Heel Company	Keene	Wood Heels
Martin, Leason & Son	Richmond	Saw Mill, Woodenware and Lumber
Mathes, W. J. & Son	Walpole	Saw Mill
N. E. Box Company	Keene, Swanzey, Winchester	Boxes and Saw Mill
New Hampshire Match Co.	East Jaffrey	Matches
Nelson Manufacturing Co.	East Swanzey	Lumber
Newell, C. J.	Alstead	Saw Mill and Retail Lumber
Norwood Calef Co.	Keene	Porch Chairs
Norcross, O. V.	Keene	Wholesale and Retail Lumber
Pittsburg Plate Glass Co.	Keene	Brush Handles
Platt Box Co.	Troy	Boxes and Toys
Robinson, Bret Co.	Keene	Door, Sash and Blinds and Retail Lumber
Russell, C. L. & Sons	Keene	Chairs
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
Walker, C. W. & Sons	Rindge	Saw Mill—Headings, Lumber
Watson, L. S. & Co.	Marlow	Cattle Cards and Lumber
Whitney Brothers	Marlboro	Toys
Whitcomb, W. T.	Swanzey	Chairs
Winn Brothers	Harrisville	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
Demers, Fred	Stratford	Saw Mill
French, Melvin H. & Son	Pittsburg	Saw Mill
Grover, Scott A.	Errol	Saw Mill
Groveton Paper Company	Groveton and Northumberland	Paper and Pulp
Hammond, Frank	Colebrook	Mill Work and Lumber, Doors, Sash and Blinds
Hicks, A. C.	Colebrook	Retail Lumber
Holt, Orrin S. & Son	Dummer	Saw Mill
Hunt, S. G.	Whitefield	Saw Mill
International Paper Company	Berlin	Paper and Pulp
Kimball, W. H. Estate	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
Poulin, John	Dalton	Retail Lumber
Paris Manufacturing Co.	Dummer (P. O. So. Paris, Me.)	Saw Mill
Parker, George F.	Lancaster	Retail Lumber
Rolfe, A. J.	Groveton and Northumberland	Doors, Sash and Blinds, Retail Lumber
Thompson Manufacturing Co.	Lancaster	Door, Sash and Blinds, Retail Lumber
Whitefield Manufacturing Co.	Whitefield	Lumber and Bobbins
White Mountain Mfg. Co.	Berlin	Lumber and Bobbins

GRAFTON COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Ashland Lumber Co.	Ashland	Saw Mill and Retail Lumber
Blodgett, Fred W.	Wentworth	Saw Mill
Boothby Company	Lincoln	Paper Plates
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.	Beebe River	Saw Mill
Draper Company	Lisbon	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
Flanders Woodworking Co.	Lebanon	Retail Lumber
Ford, Charles A.	Orange	Saw Mill
Gale, C. M. Estate	Landaff	Wholesale and Retail Lumber Saw Mill and Bobbins
Gibson, Hamlin & Spaulding	Plymouth	Wholesale and Retail Lumber
Gordon, John C.	North Woodstock	Saw Mill and Retail Lumber
Hambleton Bobbin Company	Lebanon	Bobbins
Hutchins, H. E.	Groton	Saw Mill
Kenniston, G. L. & Sons	Rumney	Tennis Racquets
Lary, Asa	Canaan	Saw Mill
Lavoie, Peter	Warren	Bobbins
Lewis, E. H.	North Haverhill	Planing Mill, Lumber and Finish
Lisbon Bobbin Co.	Lisbon	Bobbins
Lisbon Mfg. Co.	Lisbon	Saw Mill and House Finish
Littleton Lumber Co.	Littleton	Retail Lumber
McKenzie, E. J.	Franconia	Saw Mill and Retail Lumber
Merrill, A. D.	Thornton	Saw Mill and Retail Lumber
Moosilauke Lumber & Bobbin	Piermont	Bobbins and Lumber

GRAFTON COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Moulton, A. C. & Son	Piermont	Saw Mill, Wholesale and Retail Lumber
Noyes, C. M.	Landaff	Saw Mill and Bobbins
Nutter, Joshua	Bath	Lumber and Laths
Parker Young Company	Campton	Wet Pulp
Parker Young Company	Lincoln	Lumber and Paper
Parker Young Company	Franconia	Saw Mill
Pattee, Fred L.	West Canaan	Saw Mill
Pike Mfg. Co.	Pike	Bobbins and Lumber
Pratt, O. M.	Plymouth	Saw Mill and Lumber
Richardson, Frank	Littleton	Retail Lumber
Rogers, A. H.	Canaan	Saw Mill
Ross, E. J.	Bath	Saw Mill
Rogers & Godfrey	Canaan	Wholesale and Retail Lumber
Sanborn, S. O.	Orford	Saw Mill
Sawyer, A. W.	North Woodstock	Saw Mill
Shellow, Charles H.	Bath	Bobbins
Stone, D. S.	Haverhill	Retail Lumber
Squam Lake Lumber Co.	Ashland	Saw Mill and Retail Lumber
Tobey, Fred E.	Plymouth	Wholesale and Retail Lumber
United Shoe Machine Co.	Lincoln	Wood Heels
U. S. Dowel Company	Ashland	Dowels
Wells & Flanders	Enfield	Boxes
Whitney, E. P.	Franconia	General Mill Work and Bobbins
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 Shoe Form Co.	Manchester	Shoe Forms
Amoskeag Paper Mills	Manchester	Paper
Atwood, F. T.	East Manchester	Box Shooks
Bailey, Arthur A.	Manchester	Wholesale and Retail Lumber

HILLSBOROUGH COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
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
Builders Supply & Mfg. Co.	Manchester	Builders Finish
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
Curtis, A. L.	Wilton	Saw Mill and Cooperage
Dalton, A. Box Co.	Manchester	Paper and Wooden Boxes
Dawson Mfg. Co.	Hudson	Wood Novelties
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
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
Granite State Wood Heel Co.	Manchester	Wood Heels
Gregg & Sons	Nashua	Door Sash and Blinds
Greenville Chair & Table Co.	Greenville	Chairs and Tables
Hadley, Harry G.	New Boston	Saw Mill, White Pine Finish
Hadley, Frank E.	West 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

HILLSBOROUGH COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Hayden, S. J.	Brookline	Wholesale and Retail Lumber
Hayden Brothers	Hollis	Saw Mill
Hazeltine & Gordon	Merrimack	Excelsior
Hermsdorf, W. R.	Manchester	Cabinets and Store Fixtures
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
Johnson, L. M.	Hancock	French and General Woodwork
Jones, David R.	Merrimack	Tables
Kendall & Epply	Manchester	Cigar Boxes
Kendall & Hadley	Goffstown	Door, Sash and Blinds
Kimball, F. G.	Manchester	Wholesale and Retail Lumber
Lake Road Woodworking Co.	Manchester	Builders Finish
Langdell Lumber Co.	Manchester	Wholesale and Retail Lumber
Maxwell, W. H.	Manchester	Wholesale and Retail Lumber
Maine Manufacturing Co.	Nashua	Refrigerators
McElwain, W. H. Co.	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
Muir Lumber Co.	Manchester	Retail Lumber
Nashua Building Co.	Nashua	Retail Lumber
N. E. Bobbin & Shuttle Co.	Nashua	Bobbins and Shuttles
N. E. Mill & Lumber Co.	Hudson	Retail Lumber
Nettleton & Harris	Goffstown	Door, Sash and Blinds and Retail Lumber
Newton, H. G.	Francestown	Saw Mill and Wood Working
Paige, Morton & Son	Antrim	Reels
Parker Heel Co.	Nashua	Wood Heels
Parker, Frank A.	Goffstown	Wholesale and Retail Lumber
Parker, Peaslee & Odell	Reed's Ferry	Wholesale and Retail Lumber
Proctor Bros.	Hollis and Nashua	Saw Mills, 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

HILLSBOROUGH COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
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
Snow Wood Heel Co.	Manchester	Wood Heels
Stevens, Kemp & Hazen	Peterboro	Retail Lumber
Sutherland, O. A.	New Boston	Boxes and Lumber, Saw Mill
Thomas, Frank A.	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
Wheeler, Scott M.	Manchester	Wholesale and Retail Lumber
White Mountain Freezer Co.	Milford and Nashua	Saw Mill, Freezers and Lumber
Whiting, David & Son	Wilton	Saw Mill, Boxes and Lumber
Wilds, C. D.	Hancock	Finish and General Work

MERRIMACK COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Ames Wood Products Co.	Concord	Handles and Dowels
Bailey Lumber Co.	Suncook	Box Shooks and Retail Lumber
Bartlett Excelsior Co.	Warner	Excelsior
Bickford and Huckins	Gossville	Saw Mill, Lumber and House Finish
Blodgett, F. E. & Son Co.	Concord	Wholesale and Retail Lumber
Blodgett & Whittemore	Concord	Chair Stock
Boutwell, Lumber Co.	Concord	Saw Mill, Retail Lumber
Chadwick & Kidder	Franklin	Mill Work and Retail Lumber
Clark, A. T.	Pittsfield	Saw Mill
Clark, Walter E.	Franklin	Retail Lumber

MERRIMACK COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Colby, J. C.	Boscawen	Wholesale and Retail Lumber
Concord Lumber Co.	Concord	Doors, Sash and Retail Lumber
Crown Woodwork.ng Co.	Contoocook	Saw Mill and Boxes
Crown Wood Finishing Co.	Henniker	Handles and 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
Graves & Son	Concord	Chairs
Heath, C. E. & Co.	Penacook	Wholesale and Retail Lumber
Hill Toy Co.	Hill	Toys
Hill Lumber Co.	Hill	Saw Mill and Retail
Holmes & Choate	Henniker	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
Ladd, J. P. Co.	Hill	Crutches
Loveren, Frank O.	Loudon	Saw Mill
Martin & Sawyer	Warner	Wholesale and Retail Lumber
Moody, A. L.	E. Andover	Box Shooks
N. E. Box Company	Concord	Boxes
N. E. Novelty Works	Hill	Wood Novelties
Rolfe, C. M. & A. W.	Penacook	Saw Mill, Doors, Sash and Blinds and House Finish
Russell & Foster	Franklin	Retail Lumber
Sanborn, C. G.	Concord	Wholesale and Retail Lumber
Schoonmaker Chair Co.	Concord	Chairs
Stevens, C. P.	Franklin	Clothes Reels
Stevens Bros.	Bradford	Saw Mill
Stoddard, A. B.	Sutton	Saw Mill
Suncook Wood Flour Co.	Suncook	Wood Flour
U. S. Hame Co.	Andover	Hames
Woodward, O. H.	So. Sutton	Saw Mill

ROCKINGHAM COUNTY

NAME	ADDRESS	WHAT MANUFACTURE
Bailey and Mills	W. Hampstead	Wholesale and Retail Lumber
Barton Wood Heel Co.	Plaistow	Wood Heels
Barrill & Hoyt	Exeter	Wood Heels
Bartlett, W. S.	Kingston	Saw Mill and White Pine
Batchelder & Janvrin	Hampton Falls	Wholesale and Retail Lumber
Belanger Bros.	Salem	Mill Work, Door, Sash and Blind..
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
Belanger Bros.	Londonderry	Door, Sash and Blinds
Carpenter, J. N.	Newmarket	Saw Mill, Lumber and Finish
Chase, Benjamin Co.	Derry	Wood Specialties
Cheney, R. W.	Kingston	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 ..
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
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
Lincoln Wood Heel Co.	Salem	Wood Heels
Littlefield Lumber Co.	Portsmouth	Wood Turning and Retail Lumber..
Lord-Champlin Co.	Epping	Box Shooks
Lord & Carlisle	Hampton Falls	Saw Mill

ROCKINGHAM COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
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
Priest, Clifford F.	Plaistow	Heel Finishing
Randall, Isaac	Hampstead	Wholesale and Retail Lumher
Rockingham Wood Heel Co.	Derry	Wood Heels
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
Felker Bros.	Rochester	Wholesale and Retail Lumber

STRAFFORD COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
Foss, D. & Son	Dover	Saw Mill, Boxes, Doors, Sash and Blinds
Foss and Hersey	Somersworth	Wholesale and Retail Lumber
Giles & Langley	Farmington	Boxes, Shooks and Lumber
Halliday, Penfield Lumber Co.	Rochester	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	Woodenware
Rochester Lumber Co.	Rochester	Retail Lumber
Shaw, C. C.	Rochester	Wholesale and Retail Lumber
Shaw & Royal	New Durham	Wood Turning
Spaulding Fiber Co.	Rochester	Boxes
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
Buss, G. W.	East Acworth	Saw Mill
Chatfield, H. H.	Newport	General Wood Working
Claremont Ice & Lumber Co.	Claremont	Saw Mill and Retail
Claremont Paper Co.	Claremont	Paper
Cook, Bert E.	Cornish Flat	Saw Mill
Cutts, Herbert	Newport	Saw Mill and Retail Lumber
Kendall Grain Store	Charlestown	Retail Lumber

SULLIVAN COUNTY—*Continued*

NAME	ADDRESS	WHAT MANUFACTURE
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	Saw Mill, Lumber and Finish
Walker Bros.	Unity	Saw Mill