

REPORT  
OF THE  
NEW HAMPSHIRE  
FORESTRY COMMISSION

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1909 - 10

STATE OF NEW HAMPSHIRE  
BIENNIAL REPORT  
OF THE  
FORESTRY COMMISSION

FOR THE YEARS  
1909 - 1910

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FORESTRY COMMISSION

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ROBERT P. BASS, President  
JASON E. TOLLES, Treasurer  
W. R. BROWN, Secretary

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E. C. HIRST, State Forester

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NOVEMBER, 1910

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## REPORT.

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*To the Governor:*

In accordance with Section 2, Chapter 128, Laws of 1909, a biennial report is hereby submitted on the condition and progress of state forestry work with recommendations for its improvement. This report covers the two fiscal years from September 1, 1908, to August 31, 1910.

The three previous reports of the Forestry Commission were made by coöperation with the United States Forest Service, and represent detailed field investigations. Each of these reports recommended legislation providing for a state forester who should have charge of all state forestry work.

Such a law was passed and became effective May 1, 1909. The greater part of this report deals with the progress that has been made under the new law. Most of the work has been toward the control of forest fires, but forest planting and educational work have also received attention. It is aimed to show how efficient the law has been in promoting the forestry interests of the state, the conditions and requirements which the law is inadequate to serve and the measures that should be taken to improve the service.

ROBERT P. BASS,  
JASON E. TOLLES,  
W. R. BROWN,  
*Forestry Commission.*  
E. C. HIRST,  
*State Forester.*

## THE CONTROL OF FOREST FIRES.

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### FOREST FIRE DAMAGE IN NEW HAMPSHIRE.

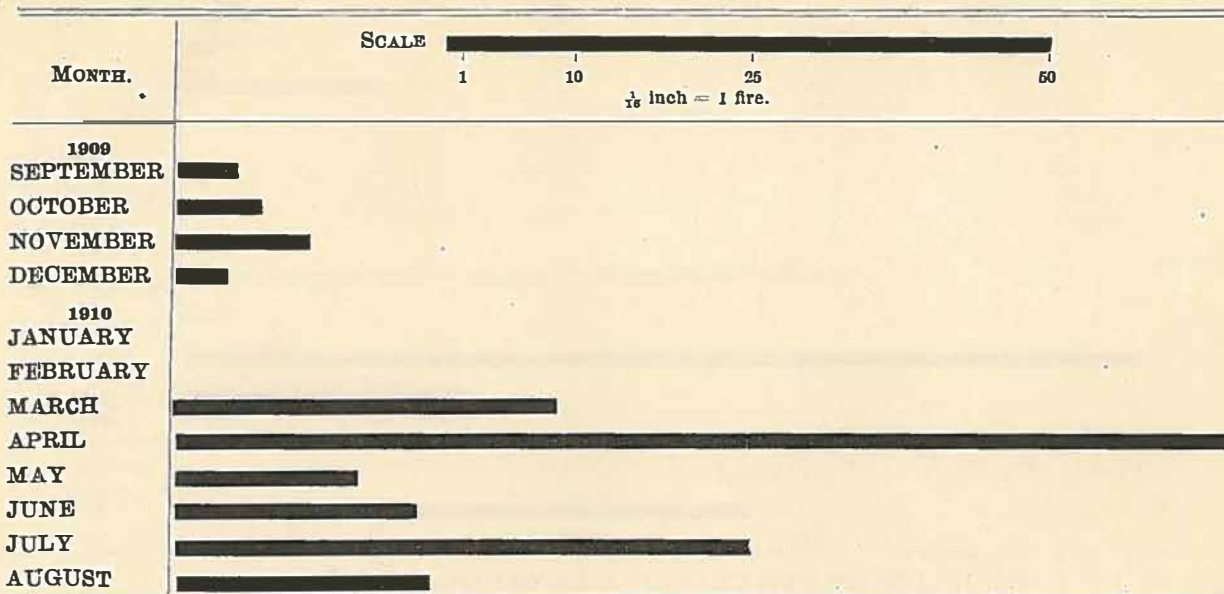
The most important step in the practice of forestry in New Hampshire is the protection of forest property against fire. The damage done to young growth and standing timber is not covered by insurance and is a clear loss to the owner. The productive power of the soil is decreased by fire, and the growth which follows is usually inferior or worthless. The increasing area of cutover land, with its highly inflammable tops and limbs and the greater number of persons that each year frequent the forests of our state combine to make the fire risk a serious one. Wherever this risk is great there will be little inducement for owners to plant trees or make conservative cuttings looking to an increased future production of timber. A system of forest fire control which prevents fire damage is the first necessary measure to insure the future forest resources of the state.

### SEASONS WHEN FOREST FIRES ARE SEVERE.

Few people realize the damage which forest fires have caused in New Hampshire within recent years. Severe loss does not occur every year. About every five or six years a season of unusually destructive fires may be expected, followed by a period of years in which the damage is not so great. Fires are numerous in the spring after the snow melts and before the leaves appear, and again in the fall, after the foliage is gone. A drought during either of these periods means severe fire damage, Table I shows the frequency of forest fires for the last fiscal year. The great

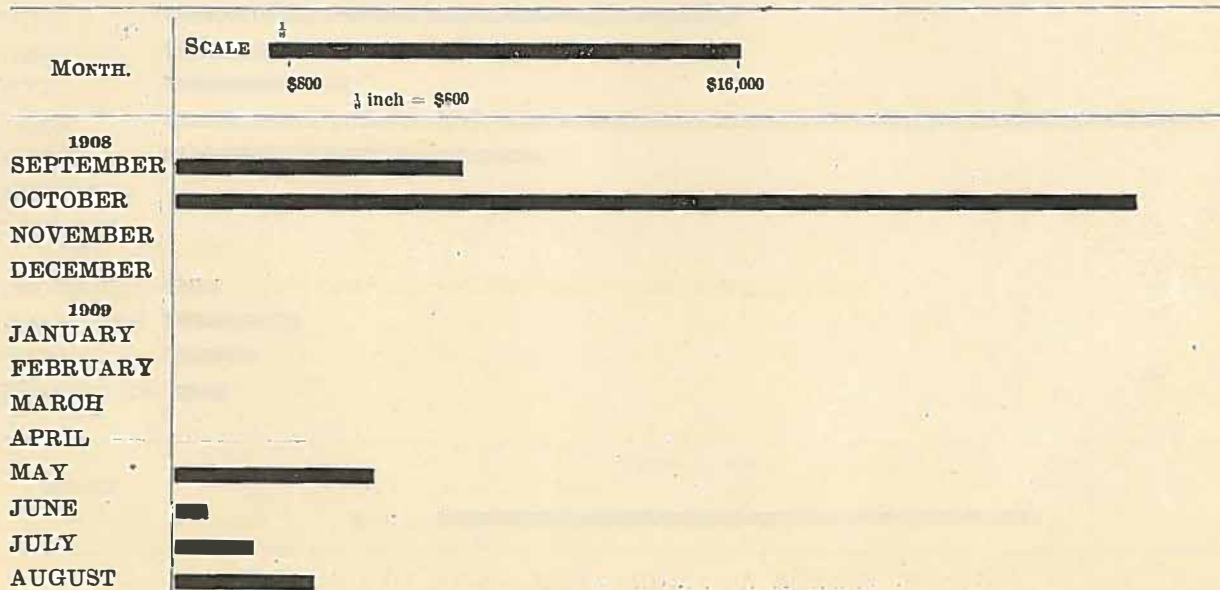
number of fires in the spring of 1910 marks a period of dry weather following the early melting of the snow in the southern part of the state. Table II shows the damage by months for the two years covered by this report. The greatest damage during this time occurred in October, 1908, a period of unusual drought. The heavy damage in April, 1910, is also brought out by this table.

TABLE I.  
FREQUENCY OF FOREST FIRES SHOWN BY MONTHS, 1909-1910.



Note the large number of fires in early spring and midsummer. Both were seasons of drought in southern New Hampshire.

TABLE II.  
DAMAGE CAUSED BY FOREST FIRES.  
SHOWN BY MONTHS FOR TWO YEARS ENDING AUGUST 31, 1910.





Heaviest damage in fall of 1908—a season of general drought. Heavy damage also in spring and summer of 1910—drought in southern New Hampshire.

## DISASTROUS FIRES AND FIRE YEARS.

The record of forest fires damage in New Hampshire is very incomplete. The first Forestry Commission Report, issued in 1885, states that up to that time fully one fourth as much merchantable timber had been destroyed as had been taken out in lumbering operations, and that very little effort was made to stop the spread of fires in the mountain region. Perhaps the largest fire of early times in the southern part of the state was the one which swept over Mount Monadnock about seventy years ago. This mountain was covered with heavy spruce timber, its present bald top being the result of the fire which destroyed even the soil. Since that time the forest growth has been slowly creeping back. A disastrous fire occurred in the Zealand Valley in 1888. It swept over about twelve thousand acres, destroying two millions board feet of logs on the skidways besides \$50,000 of standing pulpwood.

A season of very destructive fires occurred again in the spring of 1903, when 84,255 acres were burned over. This was a period of unusual drought, the rainfall for six weeks following the middle of April being only about one sixteenth that falling during the same period in normal years. Most of these fires were on cutover land, and, considering the area burned, not a great amount of large timber was destroyed; but the destruction of the young growth, the damage to forest soil, and the large amount of worthless growth which followed the fires mean a serious loss to the future wealth of the state.

There is no record of disastrous fires for several years after 1903. Two large fires, one of 800 acres in Windham and one of 5,000 acres in Lincoln, occurred in 1907. This was not a bad fire year, however, as the total area burned was less than 7,000 acres. The summer and autumn of 1908 again witnessed a great deal of fire damage. Dry weather prevailed during July, and another drought in the fall prolonged the danger season until the latter part of October.



PLATE I.—MT. MONADNOCK. BALD TOP CAUSED BY A FIRE WHICH OCCURRED ABOUT SEVENTY YEARS AGO.





PLATE II.—NORTH SUGAR LOAF. ONCE HEAVILY TIMBERED. PRESENT CONDITION RESULT OF FIRE.  
FROM NEW HAMPSHIRE FORESTRY REPORT, 1903.)

# PLATE III.

*Burned land in Northern New Hampshire shown in Red.*

*Taken from map made by  
U.S. Forest Service—July 1903.*

*Since then 24000 acres more  
have been burned over.*

MAP OF

# NEW HAMPSHIRE

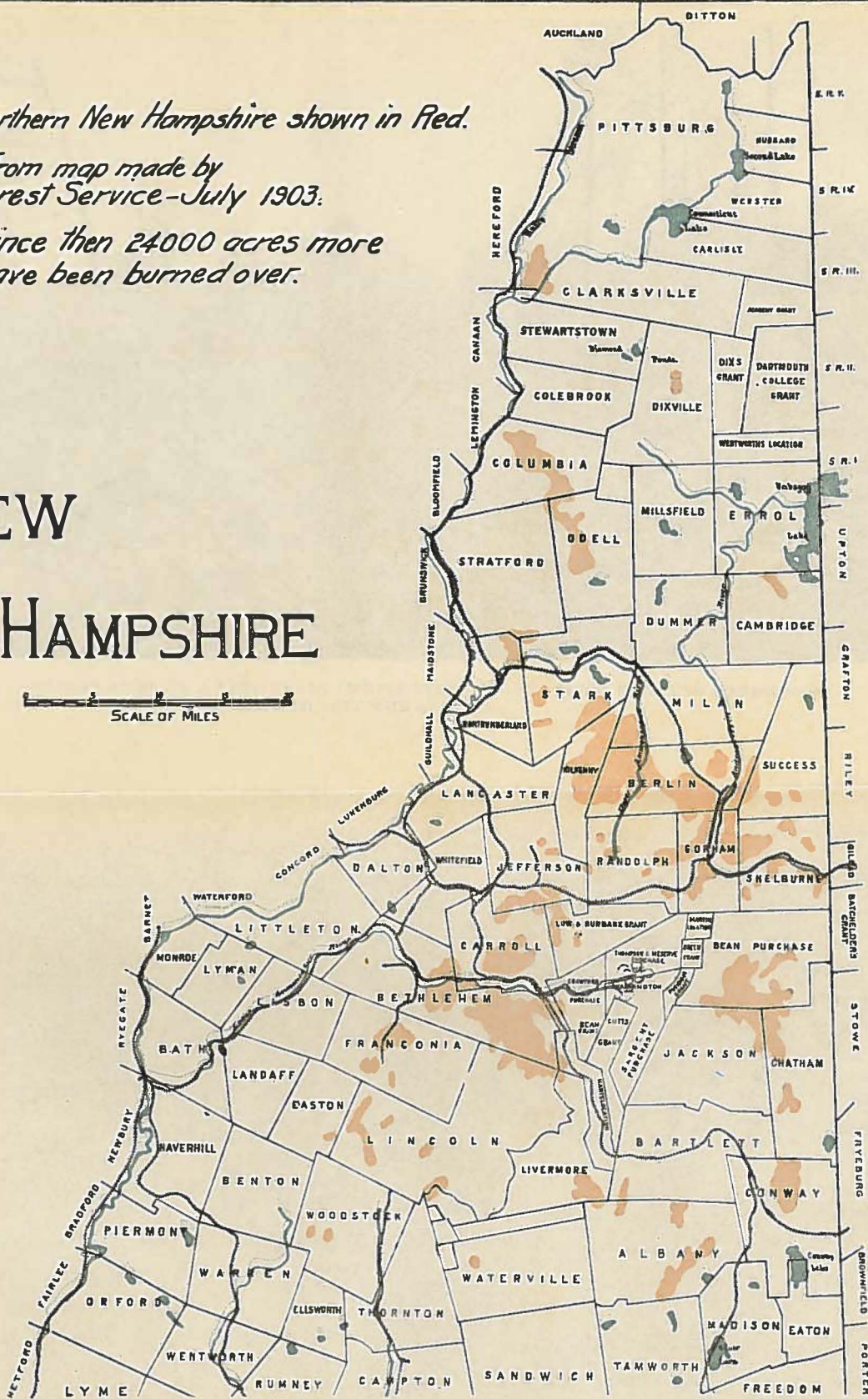




PLATE IV.—RECENT BURN ON A SAND PLAIN. WHITE PINE CUT OFF; PITCH PINE AND HARDWOODS  
LEFT TO SEED THE GROUND.

The area burned over up to September was about 6,482 acres and the loss estimated at \$26,945.

### EXTENT AND CHARACTER OF THE DAMAGE.

It would be impossible to calculate the exact amount of damage done by forest fires in New Hampshire, both on account of the insufficient data and the difficulty of calculating the damage which fire does to the future timber crop. It is aimed in this report to present in as plain a way as possible all the reliable data that could be secured, so that a citizen of any section may perceive the importance of the forest fire problem to the whole state.

It is a striking fact that the fires which occur in our state destroy comparatively little merchantable timber; the greatest damage is the destruction of young growth. Even when fire does enter the older timber it very seldom destroys much of it, but simply kills the trees and chars the trunks so the owner is obliged to sell immediately in order to realize on them. For this reason many persons have regarded the average forest fire as a matter of little consequence. During the past few years, however, interest in the subject has been increasing, and the far-sighted landowner has come to regard the forest fire in its true light, a menace to his future timber crop. The awakening interest in the forest fire question is coincident with the increasing value of young growing timber and sprout land.

The extent and character of damage caused by a forest fire depends largely on whether it burns deep in the ground, runs along the surface of the ground or in the tops of trees. It also depends on the kind of timber or other growth which it encounters, how dry the material is, and the force of the wind which drives the fire.

### IN THE MOUNTAIN REGION.

The worst fire damage in New Hampshire occurs on the slopes of the mountains and higher hills. The increased

wind velocity due to elevation and the steepness of the slopes enable fires to run very rapidly. Most of them start on cutover land where the dead tops and branches quickly dry out and favor the rapid spread of fire. The soil and the accumulation of duff (the soil sponge), which readily absorbed and retained water when covered by trees, becomes very dry when the forest cover is removed, and a very bad fire may burn it entirely up, leaving nothing but bare rocks, as shown in Plate II. Many bald peaks in the mountain region are the result of fire which has entirely destroyed the soil. On such places it will require centuries for enough soil to accumulate to support tree growth. Besides this there is no forest cover nor soil sponge to hold back the rain water, and the run-off is more rapid.

Most of the fires in the mountains do not entirely destroy the soil, but work their greatest havoc in the destruction of young growing timber and encouraging the inferior growth which generally follows. When one of these cut-over slopes is burned the young spruce and balsam and the spruce seed (unless it is deeply imbedded in the moss and the fire is light) are destroyed. Then, if there are no spruce seed trees in the immediate vicinity the possibilities for a new stand of spruce are gone. Such hardwoods as popple and yellow and paper birch, left after the spruce is cut, seed abundantly, and the fire exposes the mineral soil, making a good germinating bed for the seed. Moreover, if the fire is not severe most of the hardwoods will sprout from the root collar. The spruce cannot sprout and is therefore at a great disadvantage in the young stand. The bird cherry and raspberry, on account of their seeds being very fire resistant, often form a dense growth on burned land to the entire exclusion of tree growth. The cherry sprouts freely after repeated burnings, while the birch and popple are not so resistant, and after each fire the possibility of the land producing a valuable stand of timber is more remote.

During the summer of 1903, a forest map of northern New Hampshire was made by Alfred K. Chittenden and assistants

of the Bureau of Forestry at Washington. This map was issued with the New Hampshire Forestry Report for 1903-04, and shows the burned land of northern New Hampshire, resulting from fires up to and including the fire season of 1903. These burned areas are shown on Plate III and aggregate over 137,000 acres, a considerable part of which has been burned more than once.

Since 1903 about 24,000 acres have been burned in this region, a part of which is on land of previous burning. Young spruce is coming up on only a very small part of this burned land. The greater part represents an inferior growth of hardwoods or a worthless growth of bird cherry and berry bushes. On some of it the soil is destroyed and nothing can grow. The serious effect which fires have on our future timber supply is apparent when we realize that over 161,000 acres of the timber producing land in the mountain region has been laid waste by fire, and most of it cannot again produce a valuable crop of trees for several generations.

#### OUTSIDE THE MOUNTAIN REGION.

In the central and southern parts of the state the fires are more frequent than they are in the mountain region, but are easier to control and do not run over so much territory. The slopes are not so steep and the forest is broken up into smaller tracts by roads and farmland. The New Hampshire Forestry Report for 1905-06 states that between 1900 and 1905 about 35,000 acres were burned over in the southern part of the state. This estimate was made from field studies by G. A. Lyford and Louis Margolin of the United States Forest Service. The years 1906 and 1907 were unfavorable for the spread of fire. Probably not over 3,000 acres were burned over in these two years. In 1908, however, the southern counties suffered from the drought, and up to September over 3,500 acres were burned. For the two years ending August 31, 1910, the burned area reached about 15,000 acres. According to reports and estimates, therefore, forest fires in

southern New Hampshire since 1900 have burned over about 58,500 acres. The total area of burned land is less than the total number of acres traversed by fire since some of the fires occurred on land previously burned. On the other hand, the reports of fires previous to 1908 were very meager. The total of 58,500 acres is therefore less than the total area traversed by fire and probably less than the total acreage of burned land.

As in the mountain region, the most serious result of forest fires in the southern counties is the destruction of young growing timber and the increase of inferior growth after the fire. Large areas of seedling and sappling white pine are destroyed every year and come up to poorer trees or bushes. Young chestnut trees are very sensitive to fire, and even a light surface fire running through a young chestnut stand will kill the trees or burn the bark, and thus permit the entrance of wood-destroying fungi. The inferior hardwoods, especially the gray birch, seed very abundantly and almost invariably spring up on the burned areas. After a time white pine or some of the better hardwoods may underseed the birch and finally grow up through it, but the future timber crop is retarded many years, and unless there are seed trees of better species nearby, planting will be the only way in which the land can be made to produce timber of any value.

Fires are very frequent on dry, sandy lands and have reduced considerable areas of it to an absolutely worthless condition. Most of these lands formerly supported a thrifty growth of white pine. Since logging, however, fires have occurred at frequent intervals. Some of it is burned over almost every year. Pitch pine, which is very resistant to fire, has formed scattering stands on the burned sand plains and over large areas scrub oak occupies the ground. The pitch pine is able to survive ordinary fires, while white pine is not, hence the former is increasing. The scrub oak, on account of its sprouting capacity, is very persistent, and its dense growth prevents other trees from getting started.

Southern New Hampshire is particularly well suited to the

successful practice of forestry on account of the fact that it contains a considerable amount of land better suited to timber growing than to any other use, and most of this land is within easy reach of good markets. Though the forest fire problem is not so acute here as it is in the mountain region, it is nevertheless discouraging to consider that fires in the past ten years have run over so great an area, 58,500 acres, that on most of this area valuable young stands of growing timber were destroyed and that over part of it no timber of any value is growing.

#### TABULAR REPORTS OF FOREST FIRE DAMAGE.

The present report covers the time between September 1, 1908, and August 31, 1910, and all data bearing on the fire damage for this period has been compiled. From September, 1908, to May, 1909, the old law was in operation, and all the fires were not reported. Also the difficulties incident to putting the new law into operation make the tables and diagrams based on the reports of 1909 not so reliable as those based on the figures of 1910. It may fairly be assumed that the figures for 1910 are reasonably accurate, while those of 1909 and the fall of 1908 are below the actual.



TABLE III.  
RESULTS OF FOREST FIRES.  
Classified by Counties—Two Years Ending August 31, 1910.

COUNTIES.	FALL OF 1908. Sept. 1 to Oct. 30.			SPRING AND SUMMER, 1910. May 1 to Aug. 31.			FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			TOTALS.		
	No. of Fires.	Area Burned.	Damage.	No. of Fires.	Area Burned.	Damage.	No. of Fires.	Area Burned.	Damage.	No. of Fires.	Area Burned.	Damage.
Belknap .....	3	100	\$1,200	13	155	\$796	11	343.5	\$3,180	27	598.5	\$5,176
Carroll .....	7	802	2,300	2	8	21	16	770.5	7,645	25	1,640.5	10,056
Cheshire .....	1	8	50	13	294.5	370	19	282	3,596	33	584	4,016
Coos .....	7	5,834	26,575	5	98	717	6	55	231	18	5,987	27,523
Grafton .....	14	1,976	7,030	6	230	565	13	602	1,810	33	2,808	9,405
Hillsborough .....	37	796	2,155	44	584	3,929	71	2,593	15,601	152	3,973	21,535
Merrimack .....	3	8	80	16	299	1,664	65	3,078	6,196	84	3,385	7,940
Rockingham .....	2	4	20	31	916.5	6,057	27	2,566	12,256	60	3,516.5	18,333
Strafford .....	3	900	3,700	4	63	205	12	468	4,640	19	1,421	8,545
Sullivan .....	1	75	150	5	37.5	557	13	237	350	19	369.5	1,057
Totals .....	78	10,563	\$43,350	139	2,715.5	\$14,731	253	11,004	\$55,505	470	24,283	\$113,586

Table III shows the number of fires, area burned, and damage classified by counties for the two years ending August 31, 1910. These figures are taken from reports received from forest fire wardens, the detailed figures for each town being given in Table VI. The bad fire season of 1908 is brought out by the fact that two-fifths of all the area burned and damage caused during the two years was in September and October, 1908. The summer of 1909 was a very favorable one, there being only \$14,731 damage. The year ending August 31, 1910, however, shows a total damage of \$55,505, due in large measure to the early melting of snow and the summer drought in the southern part of the state. The total of 470 fires for the two years with 24,283 acres burned over and a damage of \$113,586 are conservative figures, as there is no doubt that a number of fires were not reported.

Since the record of burned land and damage for the year ending August 31, 1910, is more accurate than that for any year previous the data have been worked out in detail and are presented in Tables IV and V. These tables represent the fall season of 1909 and the spring and summer of 1910. The early rains in the mountain region in the fall of 1909 and the frequent rains during the spring and summer of 1910 prevented serious damage in the northern part of the state. A total of only 1,447 acres burned over and a damage of \$9,646 for the three upper counties (Grafton, Carroll, and Coös) during the past year is very significant in comparison with the burned area of 11,667 acres and damage of \$54,880 for the same counties in 1908. On the other hand, the drought which prevailed over central and southern New Hampshire during the spring and summer of 1910 is reflected in the severe fire damage in the southern counties. In Table IV it is striking to notice that nearly one half the area burned was young growth, while less than one sixth was merchantable timber. About one fourth the burned area was cut-over land and less than one eighth was on pasture and farm land. In Table V it is interesting to note that nearly one half the actual damage was to young growth.

(the future timber crop), about one fifth to merchantable timber, while somewhat less than one half the damage was caused by the burning of cut logs, lumber, and cordwood.

TABLE IV.

## ACRES BURNED BY FOREST FIRES.

September 1, 1909, to August 31, 1910.

COUNTIES.	Merch. Timber.	Young Growth.	Cutover Land.	Pasture and Farm.	Total.
Belknap .....	.....	91	252.5	.....	343.5
Carroll .....	62.5	405	160	143	770.5
Cheshire .....	10.0	150%	79%	41%	281%
Coos .....	.....	35%	15	5	55%
Grafton .....	508.5	22.5	59	12	602
Hillsborough .....	439%	1,495	385	273.5	2,592%
Merrimack .....	309	1,514%	887	367	3,077%
Rockingham .....	403%	1,056%	792%	313%	2,565%
Strafford .....	65	291%	75	27	458%
Sullivan .....	7	30	63	157	257
Totals .....	1,804%	5,091%	2,768%	1,339%	11,004%

TABLE V.  
DAMAGE CAUSED BY FOREST FIRES.  
September 1, 1909, to August 31, 1910.

COUNTIES.	Merch. Timber.	Young Growth.	Logs, lumber, cordwood, Etc.	Other Dam- age, Fences, Etc.	Total.
Belknap .....		\$280	\$2,900		\$3,189
Carroll .....	\$1,477	4,098	2,025	\$45	7,645
Cheshire .....	515	670	2,400	11	3,596
Coos .....		86	140	5	231
Grafton .....	1,560	225		25	1,810
Hillsborough .....	2,570	5,321	7,700	10	15,601
Merrimack .....	1,150	3,651	1,395		6,196
Rockingham .....	1,720	9,546	955	35	12,256
Strafford .....	1,565	1,750	1,325		4,640
Sullivan .....	75	205	40	30	350
Totals .....	\$10,632	\$25,832	\$1,880	\$161	\$55,505

The following tabular report covers the two years from September 1, 1908, to August 31, 1910. It is based on the reports of forest fire wardens and bills received from towns and cities, and shows the number of fires, area burned, damage and cost of fighting.

TABLE VI.  
FOREST FIRES.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (BELKNAP CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Alton.....									7	240	\$3,025	\$544.46
Barnstead.....					4	95	\$530	\$122.50	1	1		19.10
Belmont.....					3	7	82	13.18				35.74
Center Harbor.....												
Gilford.....												
Gilmanston.....	3	100	\$1,200	\$300								77.24
Laconia.....					3	50	179	9.60				134.50
Meredith.....					3	3	5	32.74	2	2 5	5	26.60
New Hampton.....									1	100	150	141.30
Sanbornton.....												
Tilton.....												
Totals.....	3	100	\$1,200	\$300	13	155	\$796	\$178.02	11	343.5	\$3,180	\$978.84

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (CARROLL CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Albany.....												
Bartlett.....												
Brookfield.....									1	150	1,025	\$274.94
Chatham.....												
Conway.....	1	150	\$2,000	570					4	138	1,750	85.54
Raton.....												
Effingham.....	3	40	200	300					1			
Freedom.....												
Hart's Location.....	2	22	190						1	100	2,000	
Jackson.....												
Madison.....									3	7	80	10.00
Moultonborough.....												
Ossipee.....					2	8	\$21	\$5.93	1	10	20	
Sandwich.....	1	650		150								
Tamworth.....												
Triftonborough.....												
Wakefield.....									5	365.5	2,770	20.04
Wolfboro.....												
Totals.....	7	862	\$2,390	\$1,150	2	8	\$21	\$5.93	16	770.5	\$7,645	\$391.12

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (CHESHIRE CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUM- MER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Alstead .....					1				1	4	\$2 410	\$26.54
Chesterfield .....					1	2		\$9.24				
Dublin .....												
Fitzwilliam .....					3	8	\$63	32.80	7	8 $\frac{3}{4}$	44	166.70
Gilsun .....												
Harrisville .....												
Hinsdale .....					1	50		28.00	2	55	210	25.50
Jaffrey .....					2	70	125	207.74	1	1	2	73.90
Keene .....					2	55	15	131.24				
Marlborough .....									1	8	25	
Marlow .....												
Nelson .....												
Richmond .....									1	50	100	40.24
Rindge .....					2	106	115	112.52	3	76	650	46.34
Roxbury .....												
Stoddard .....	1	8	\$50									
Sullivan .....												
Surry .....					1	1.5	60	5.00				
Swanzey .....									2	3.5	25	189.30
Troy .....												
Walpole .....												
Westm'reland .....									1	75	180	
Winchester .....					1	2	2	10.50				42.50
Totals .....	1	8	\$50		13	294.5	\$370	\$537.04	19	281 $\frac{3}{4}$	\$3,596	\$611.02

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (Coos Co.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Berlin .....												
Carroll .....	2	750	\$850	\$537	1	11	\$5	\$50.06				
Clarksville .....												
Colebrook .....												
Columbia .....					1	20	100	13.00				
Dalton .....	1	20	200		1	60	600	68.00	1	25	\$25	\$12.00
Dummer .....												
Errol .....												
Gorham .....									2	12½	6	100.00
Jefferson .....												
Lancaster .....									1	3		
Milan .....												
Northumberland .....									1	8	200	
Pittsburg .....												
Randolph .....												
Shelburne .....	2	5,000	25,500	2,000								6.64
Stark .....												
Stratford .....	2	4	25	76								
Stewartstown .....												
Wentworth's Location .....					2	7	12	71.94	1	7		12.44
Whitfield .....												
Totals .....	7	5,834	\$26,575	\$2,613	5	98	\$717	\$206.00	6	55½	\$231	\$140.28





Littleton .....	3	27	50	40	1	100	200	25.50	1	3	.....	3.00
Livermore .....	1	1	150	15	.....	.....	.....	.....	4	484.5	1,180	141.82
Lyman .....	2	40.5	220	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lyme .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Monroe .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orange .....	1	7.5	50	40	.....	.....	.....	.....	.....	.....	.....	3.50
Orford .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piermont .....	1	20	75	50	1	100	250	25.74	.....	.....	.....	.....
Plymouth .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rumney .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Thornton .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Warren .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Waterville .....	.....	.....	.....	.....	.....	.....	.....	.....	1	50	.....	.....
Wentworth .....	2	1,300	2,800	400	.....	.....	.....	.....	.....	.....	.....	.....
Woodstock .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals .....	14	1,076	\$7,030	\$1,865	6	230	\$565	\$149.58	13	602	\$1,810	\$259.72

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (HILLSBOROUGH CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Amherst .....					3	27½	\$452	\$28.24	1	½	\$50	\$56.50
Antrim .....					1	8	10	24.74				
Bedford .....									2	12	150	27.44
Bennington .....									3	58	40	45.94
Brookline .....									3	86	615	31.44
Deering .....	4	400	\$1,200	\$450					1	60	50.00	37.60
Francetown .....	2	175	60	185								
Goffstown .....					2	25	200	10.50	3	1,090	452	102.84
Greenfield .....									1	2	8	2.52
Greenville .....												
Hancock .....												
Hillsborough .....												
Hollis .....					2	7	20.00	45.00				22.24
Hudson .....									1	220	625	89.20
Litchfield .....					1	5	15.00	1.50				
Lyndeborough .....												
Manchester .....	29	206	150		24	104.5	400		39	227.5	195	
Mason .....									1	150	1,400	61.80
Merrimack .....					4	82.5	375	43.20	2	170	9,050	74.40
Millford .....									4	250	455	289.04
Mont Vernon .....												
Nashua .....	2	15	205	25					2	160	1,250	
New Boston .....					2	15	7	11.24	1			
New Ipswich .....					1	125	1,500	66.40	4	48	680	

Pelham .....	1	50	700	14.00	1	30	500	97.65
Peterborough .....	2	55	700	87.24				
Sharon .....								
Temple .....	1	20	100	20.50	2	16	75	16.00
Weare .....								24.00
Wilton .....								
Windsor .....								
Totals .....	37	796	\$2,155	\$333.16	71	2,592 1/2	\$15,601	\$978.62

TABLE VI.—Continued.  
Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (MERRIMACK Co.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUM- MER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Allenstown.....					1	100	\$700	\$153.08	3	60	\$40	\$54.24
Audover.....									3	9	310	68.68
Boscawen.....									3	150	560	94.04
Bow.....					1	4	14	29.74	3	383	205	60.70
Bradford.....												
Canterbury.....												
Chichester.....												
Concord.....					4	16.5	60	36.00	25	1364	951	155.36
Danbury.....												
Dunbarton.....									4	214	1,060	15.36
Epsom.....									2	16	175	12.74
Franklin.....					6	143	540	150.27	4	285	220	275.34
Henniker.....									4	24	16	56.94
Hill.....												
Hooksett.....					1	20	200	143.40	7	700	800	480.40
Hopkinton.....	1	4	\$50	\$10	1	14	150	11.00	1	100	60	22.50
Loudon.....												17.00
Newbury.....									2	1		
New London.....												
Northfield.....												
Pembroke.....									3	63	1,400	
Pittsfield.....					2	15		10.74				51.94
Salisbury.....	2	4	30	75								
Sutton.....												
Warner.....									2	52	400	
Webster.....												
Wilmot.....												
Totals.....	3	8	\$80	\$85	15	299	\$1,664	\$534.20	65	3077	\$6,196	\$1,384.24

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (ROCKINGHAM CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUM- MER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Atkinson.....					2	8.5	\$200	\$43.00	1	8	\$415	\$54.08
Auburn.....												
Brentwood.....												
Candia.....	1	2	\$15		1	100	300	190.30	1	17		20.60
Chester.....					1	10	100	12.50	2	26	300	50.00
Danville.....												
Deerfield.....					2	30	250	46.24				
Derry.....					3	134	385	125.26	1	10		126.58
East Kingston.....					1	2	50	8.00	1			
Eppling.....					1	3	50	9.50		2	30	13.30
Exeter.....					4	56	78	97.50	1	4		9.60
Fremont.....												
Greenland.....												
Hampstead.....												
Hampton.....												
Hampton Falls.....												
Kensington.....												40.70
Kingston.....	1	2	5									40.60
Londonderry.....									3	25	43	26.58
Newcastle.....												
Newfields.....									3	339	2,085	54.70
Newington.....												
Newmarket.....					1	4	10	249.42	1			
Newton.....									1		40	9.80
Northampton.....												

TABLE VI.—Continued.  
Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (ROCKINGHAM Co.— Continued.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Northwood.....					2	160	2,080	37.48	1	35	75	.....
Nottingham.....					3	300	2,275	307.03				.....
Plaistow.....					1	10	20	5.04				.....
Portsmouth.....					1	12	200	31.00				38.00
Raymond.....									2	37	540	89.24
Rye.....												.....
Salem.....					6	12	84.00	104.50	3	9	53	544.49
Sandtown.....												.....
Seabrook.....									3	33	825	.....
South Hampton.....												.....
Stratham.....					1	5		23.00				.....
Windham.....					1	100	25.00	24.80	3	2,020	7,850	270.34
Totals.....	2	4	\$20	.....	31	946.5	\$8,057.00	\$1,314.92	27	2,566½	\$12,256	\$1,388.52

TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (STRAFFORD CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUM- MER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Barrington.....	1	100	\$500	\$50	.....	.....	.....	.....	1	100	\$1,100	.....
Dover.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Durham.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Farmington.....	.....	.....	.....	.....	.....	.....	.....	.....	2	7.5	200	\$16.56
Lee.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madbury.....	.....	700	2,500	300	.....	.....	.....	.....	.....	.....	.....	.....
Middleton.....	1	100	700	.....	.....	.....	.....	.....	1	00	75	31.30
Milton.....	.....	.....	.....	.....	1	2	.....	.....	6	105½	1,200	287.24
New Durham.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rochester.....	.....	.....	.....	.....	3	61	\$205	\$48.50	1	150	1,200	29.30
Rollinsford.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Somersworth.....	.....	.....	.....	.....	.....	.....	.....	.....	1	35	775	.....
Strafford.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals.....	3	900	\$3,700	\$350	4	63	\$205	\$48.50	12	438½	\$4,640	\$364.40



TABLE VI.—Continued.

Occurrence—Area Burned—Damage—Cost of Fighting.—September 1, 1908, to August 31, 1910.

NAME OF TOWN. (SULLIVAN CO.)	FALL OF 1908. Sept. 1 to Dec. 1.				SPRING AND SUMMER, 1909. May 1 to Aug. 31.				FALL, 1909; SPRING AND SUMMER, 1910. Sept. 1, 1909, to Aug. 31, 1910.			
	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.	No. of Fires.	Area Burned.	Damage.	Cost of Fighting.
Aeworth.....												
Charlestown.....	1	75	\$150	\$100.00	1	20	\$70	\$19.70	4	44.5	\$40	\$141.23
Claremont.....					4	17.5	57	120.14	7	181.5	110	81.91
Cornish.....												
Croyden.....												
Goshen.....												
Grantham.....												
Langdon.....									1	1		
Lempster.....									1	30	200	
Newport.....												
Plainfield.....												
Springfield.....												
Sunapee.....												
Unity.....												
Washington.....												
Totals.....	1	75	\$150	\$100	5	37.5	\$557	\$139.64	13	257	\$350	\$223.12
Totals, 10 counties....	78	10,563	\$43,350	\$7,123	139	2,713½	\$14,731	\$3,466.96	263	11,004	\$55,505	\$6,099.88

THE FOREST FIRE LAW AND THE APPOINTMENT  
OF WARDENS.

The present forestry law, which took effect May 1, 1909, is here appended:

AN ACT TO IMPROVE THE STATE SYSTEM OF FOREST PRO-  
TECTION.

(Chapter 128, Laws of 1909.)

SECTION 1. On the first day of May, 1909, the governor, with the advice of the council, shall appoint a forestry commission of three members, one of whom shall hold office for one year, one for two years, and one for three years, and thereafter shall appoint their successors for terms of three years each; the said commissioners to serve without compensation, but to receive for their legitimate expenses in the exercise of their duties such sums as the governor and council shall audit and approve, to be paid from the treasury upon warrant of the governor.

SECT. 2. The forestry commission shall appoint a state forester to serve at the will of the commission at a salary to be fixed by them, not exceeding \$1,800. He shall be allowed reasonable traveling and field expenses incurred in the necessary performance of his official duties. He shall maintain headquarters at the state capital, and shall be allowed necessary office expenses. He shall, as far as his duties as state forester may permit, carry on an educational course of lectures on forestry at the farmers' institutes and similar meetings within the state. He shall, under the supervision of the forestry commission, execute all matters pertaining to forestry within the jurisdiction of the state. He shall be state forest fire warden, and shall receive no additional compensation therefor, but shall receive his necessary traveling and other expenses. He shall cooperate with all the fire wardens in the state, and aid and direct them in their duties. It shall be his duty to see that the fire wardens throughout

the state take such action as is authorized by law to prevent and extinguish forest fires. He shall, under direction of the forestry commission, prepare biennially a report to the governor on the progress and condition of state forest work and recommend therein plans for improving the state system of forest protection, management, and replacement. Such report shall contain an itemized statement of all expenses incurred or authorized by the state forester or by the forestry commission.

SECT. 3. The state forester shall, upon request and whenever he deems it essential to the best interests of the people of the state, cooperate with counties, towns, corporations, and individuals in preparing plans for the protection, management and replacement of trees, woodlots, and timber tracts, on consideration and under an agreement that the parties obtaining such assistance pay his field expenses while he is employed in preparing said plans.

SECT. 4. The selectmen of all towns and the mayors of all cities, and other citizens, shall, as soon as may be after this act takes effect, recommend to the state forester the names of such persons as may in their estimation be fit to fill the offices of forest fire wardens in their respective towns and cities. After investigation, the state forester may choose from the persons recommended, as above prescribed, not more than one competent person in each town and city to be forest fire warden for said town or city. Upon the appointment of a forest fire warden by the state forester in any town or city, the term of office of the forest fire warden or the terms of office of the forest fire wardens then or theretofore acting as such in said city or town shall immediately cease, and the new appointee shall thereafter serve as such officer until his death, resignation, or removal. The state forester shall have the power, in the exercise of his discretion, to remove any forest fire warden from office. Upon the termination in any manner of the term of office of any forest fire warden, a successor shall be appointed in the manner hereinbefore provided for the appointment of such officers

originally. In time of drought the forest fire wardens, themselves, or by some agent or agents designated by them, shall, when directed by the state forest fire warden, patrol the woods in their respective cities or towns, warning persons who traverse the woods, campers, hunters, fishermen, and others, about lighting and extinguishing fires. They shall post extracts from the fire laws, and other notices sent to them by the state forest fire warden, along the highways, along streams and waters frequented by tourists and others, at camp sites, and in other public places. If, in woodlands thus posted, any person, other than the owner of said lands or his agents acting under his direction, shall build fires when warned not to do so by the forest fire warden, or shall fail to extinguish a fire when ordered to do so by the warden, he may be arrested by the state forest fire warden or the town forest fire warden without a warrant.

SECT. 5. In unincorporated places the state forest fire warden may appoint one or more deputy forest fire wardens to have the same powers and the same duties as the town forest fire wardens. When so appointed by the state forest fire warden, said deputy shall succeed the present incumbent, if any. The state forest fire warden shall have power to remove deputy forest fire wardens from office at his discretion.

SECT. 6. The state forest fire warden may, in his discretion, appoint a forest fire warden to serve in a group of towns or unincorporated places, or both, instead of appointing one such warden for each town or place.

SECT. 7. It shall be the duty of the town forest fire warden to extinguish all brush or forest fires occurring in his town, and he may call such assistance as he shall deem necessary to assist him in so doing, and may require the use of wagons, tools, horses, etc., for that purpose. If any person fail to respond to the warden's call for his assistance or the use of his property, he shall be fined not exceeding ten dollars. Forest fire wardens in towns and unincorporated places shall be allowed for their services performed under

this act such remuneration as may be fixed by the forestry commission or the state forester. The owners of all property required by a forest fire warden in the extinguishment of a forest or brush fire shall receive reasonable compensation therefor.

SECT. 8. In case the forest fire warden and the persons summoned to assist him or to furnish the use of property, shall fail to agree upon the terms of compensation at the time of or after the required service has been rendered, the dispute shall be referred to the commissioners of the county in which the city or town is located, for final settlement.

SECT. 9. The expenses of fighting fires in towns and cities shall be borne equally by the town or city and by the state. The town and city forest fire wardens shall render to the selectmen or mayor, as the case may be, a statement of said expense within one month of the date they are incurred, which said bill shall show in detail the amount and character of the services performed, the exact duration thereof, and all disbursements made by said wardens; said bill shall be audited, and if approved by the selectmen of the town or mayor of the city wherein such services were rendered and expenses incurred, shall be paid on the order of said selectmen by the town or city treasurer. A duplicate bill, showing that the same has been audited and paid by the town, shall be filed by the town or city treasurer with the state forest fire warden, who shall draw his order on the state treasurer in favor of said town for the portion of said bill for which the state is liable in accordance with the provisions of this section.

SECT. 10. The deputy forest fire wardens in unincorporated places shall render to the state forest fire warden a statement of such expenses as they have lawfully incurred under this act in fighting or preventing fires in woodlands within one month of the date upon which such expenses are incurred. The aforesaid statements shall show in detail the amount and character of the services performed, the exact duration thereof, and all disbursements so made by said dep-

uty forest fire wardens. The aforesaid statement shall be audited by the state forest fire warden and if by him approved he shall draw an order upon the state treasurer for the same. All expenses incurred in an unincorporated place under this act shall be borne equally by the state and said unincorporated place; but the total expenses shall be paid in the first instance from the state treasury, and one half thereof shall be added to the tax assessed the following year against said place in the same manner as is provided by chapter 62 of the Public Statutes for the assessment of taxes in unincorporated places generally.

SECT. 11. Town and other forest fire wardens shall make reports of their doings to the state forest fire warden in such form and at such times as the state forest fire warden may require. If a warden has reason to believe that any brush or forest fire in his city or town was caused in violation of statute he shall report to the county solicitor all the facts coming within his knowledge, and said solicitor, if the facts as so reported seem to him sufficient, shall take action to recover the penalty fixed by statute for such violation.

SECT. 12. No person shall kindle a fire upon public land without permission first had from the forestry commission or the town forest fire warden, or from the official caretaker of such public land. No person shall kindle a fire upon the land of another without permission first had from the owner thereof or from the owner's agent.

SECT. 13. During times of drought no person shall kindle a fire or burn brush in or near woodland without the written permission or the presence of the forest fire warden.

SECT. 14. Fires kindled by throwing down a lighted match, cigar or other burning substance, shall be deemed within the provisions of sections 12 and 13, and every person violating any provision of said section shall be fined not more than two hundred dollars, or imprisoned not more than sixty days, or both.

SECT. 15. The state forest fire warden, or any other forest fire warden, may arrest, without warrant, any person

or persons taken by him in the act of violating any of the laws for the protection of forest lands, and bring such person or persons forthwith before a justice of the peace or other justice having jurisdiction, who shall proceed without delay to dispose of the matter as justice may require.

SECT. 16. Every person who shall set fire on any land, that shall run upon the land of any other person, shall pay to the owner all damages done by such fire.

SECT. 17. If any forest fire warden provided for in this act shall willfully neglect or refuse to perform the duties prescribed for him he shall forfeit not less than \$100 nor more than \$500, to be recovered in an action for debt upon complaint of the forestry commission, and all forfeitures so recovered shall be paid into the state treasury.

SECT. 18. It shall be the duty of any person who discovers a forest or brush fire not under the control or supervision of some person to extinguish it or to report it immediately to the local forest fire warden, and failure so to do shall be punished by a forfeiture not exceeding ten dollars, to be recovered upon complaint of the warden.

SECT. 19. All moneys received from fines imposed under and by virtue of the provisions of this act shall be paid to the state treasurer and kept by him as a separate fund, to be paid out by him upon the requisition of the state forest fire warden, for use in connection with, and the prevention and suppression of, forest fires.

SECT. 20. Whenever any person or persons shall supply the necessary funds therefor, so that no cost or expense shall accrue to the state, the forestry commission is hereby authorized to buy any tract of land and devote the same to the purposes of a public park. If they cannot agree with the owners thereof as to the price, they may condemn the same under the powers of eminent domain, and the value shall be determined as in case of lands taken for highways, with the same rights of appeal and jury trial. On the payment of the value as finally determined, the land so taken shall be vested in the state, and forever held for the purposes of a public

park. The persons furnishing the money to buy said land shall be at liberty to lay out roads and paths on the land, and otherwise improve the same under the direction of the forestry commission, and the tract shall at all times be open to the use of the public.

SECT. 21. The sum of four thousand dollars is hereby appropriated for the purpose of carrying into effect the purposes of this act for the year ending August 31, 1909.

SECT. 22. Chapter 44 of the session laws of 1893 and chapter 97 of the session laws of 1905 are hereby repealed. All other acts and parts of acts inconsistent with this act are hereby repealed. This act shall take effect May 1, 1909.

The sums hereinafter mentioned are appropriated, to be paid out of the treasury of the state for the purposes specified, for the fiscal year ending August thirty-first, nineteen hundred and ten, to wit:

For forestry protection, eight thousand dollars (\$8,000).

The sums hereinafter mentioned are appropriated, to be paid out of the treasury of the state for the purposes specified, for the fiscal year ending August thirty-first, nineteen hundred and eleven, to wit:

For forestry protection, eight thousand dollars (\$8,000).

The Forestry Commission met on May 19, 1909, to consider the appointment of a forester. On June 18 another meeting was held, and on June 22 Edgar C. Hirst, a graduate of the Yale Forest School, was appointed State Forester and established an office at Concord on July 1, 1909. Commission meetings were held thereafter on June 30, July 6, August 16 and 17, September 17, October 12, 1909, and on February 12, March 30, June 29, and August 3, 1910. The commission followed the general plan of outlining the forester's work for a month or more in advance and appointing a time for future meeting at which the progress of the work could be discussed and plans made for improving it.



## APPOINTMENT OF FOREST FIRE WARDENS.

The first work undertaken by the forester was the appointment of forest fire wardens. Since the law required the appointment of one in each town, it was evident at the start that this would require considerable time. Moreover, fires were occurring in different parts of the state and it was necessary to have someone looking after them. The law provides for equal division of the expenses incurred in fighting fires between the towns and the state, and it was therefore necessary to appoint wardens immediately so an accurate account of these expenses would be kept and rendered.

To meet this situation a letter was addressed to the wardens who had held office under the previous law, stating the provisions of the new law and asking them to continue in office until a permanent appointment could be made. In towns where no fire warden was acting the chief of the fire department or one of the selectmen was asked to take the office temporarily.

At the same time a letter was sent to the boards of selectmen, mayors of cities, and other citizens known to be interested in forest protection, asking them to recommend persons well qualified for the office of fire warden. The aim has been to secure in each town a reliable man centrally located, who can be reached by telephone, and who can get out a crowd of men quickly and handle them effectively in fighting fire. To do this it was necessary for the forester to visit nearly every town in the state, meet the selectmen and timberland owners, and appoint the best man who could be secured. By pursuing this method other lines of work were carried on while the wardens were being appointed and a much better corps of wardens has been secured than if the appointments had been made with undue haste.

## FOREST FIRE WARDENS.

## BELKNAP COUNTY.

Alton,	George W. Place.
Barnstead,	E. B. Drake.
Belmont,	C. O. Judkins.
Center Harbor,	James R. Lovett, Meredith.
Gilford,	A. H. Bacon.
Gilmanton,	C. L. Chase.
Laconia,	✓ Arthur W. Spring.
Meredith,	John H. Morrison.
New Hampton,	Charles D. Thyng.
Sanbornton,	✓ F. H. Hunkins, R. F. D. No. 1, Laconia.
Tilton,	A. F. Cunningham, R. F. D.

## CARROLL COUNTY.

Albany,	Archie Nickerson, Pequaket.
Bartlett,	✓ Frank Cannell.*
	F. J. Ward.
Brookfield,	✓ Charles Willey, Sanbornville, N. H.
Chatham,	Seth Hanscom.
Conway,	W. M. Wyman, Intervale.
Eaton,	Fred E. Kennison, Snowville.
Effingham,	✓ Richard Dearborn.
Freedom,	John E. Perkins.
Hart's Location,	C. H. Morey, Bemis, N. H.
Jackson,	J. B. Hurlin.
Madison,	George A. Nickerson.
Moultonborough,	George H. Bragg.
Ossipee,	Frank E. Palmer, Moultonville.
Sandwich,	Langdon C. Ambrose, Sandwich.
Tamworth,	A. E. Wiggin.
Tuftonborough,	✓ Edwin B. Edgerly, Mirror Lake.
Wakefield,	Frank J. Leavitt, Sanbornville.
Wolfeboro,	Ovid Young.

\* Resigned.

## CHESHIRE COUNTY.

Alstead,	H. C. Metcalf.
Chesterfield,	✓ A. H. Post, Spofford.
Dublin,	A. H. Childs.
Fitzwilliam,	W. M. Chaplin.
Gilsum,	Leon M. Osborne.
Harrisville,	✓ B. F. Bemis, Chesham.
Hinsdale,	Fred A. Buckley.
Jaffrey,	L. W. Davis, East Jaffrey.
Keene,	Louis Nims.
Marlboro,	C. B. Collins.
Marlow,	
Nelson,	W. S. Mansfield, Munsonville.
Richmond,	S. A. Bullock, R. F. D. No. 4, Winchester.
Rindge,	Albert L. Hale, East Rindge.
Roxbury,	L. W. Davis, R. F. D. No. 2, Keene.
Stoddard,	C. B. McClure, Munsonville.
Sullivan,	T. A. Hastings.
Surry,	Hollis W. Harvey.
Swanzy,	Benjamin C. Snow, West Swanzy.
Troy,	✓ Asa C. Dort.
Walpole,	W. D. Knowlton.
Westmoreland,	Wilfred G. Reed, Westmoreland Depot.
Winchester,	E. C. Hildreth.

## COOS COUNTY.

Berlin,	Winfred Hodgdon.
Carroll,	✓ John Paige, Bretton Woods.
Clarksville,	✓ W. W. Young, Beecher Falls, Vt.
Colebrook,	L. M. Lombard.
Columbia,	John Gray.
Dalton,	W. B. Aldrich.
Dummer,	Fred U. Woodward, Milan.
Errol,	A. E. Bennett.
Gorham,	T. E. Malloy.

Jefferson,	L. D. Kenison.
Lancaster,	Samuel R. Amadon.
Milan,	John L. McIntire.
Northumberland,	William Hayes, Groveton.
Pittsburg,	✓ W. N. Judd.
Randolph,	✓ F. C. Wood.
Shelburne,	James Simpson.
Stark,	W. T. Pike.
Stewartstown,	Byron Drew.
Stratford,	W. H. Kimball.
Wentworth's Location,	✓ J. R. Turner.
Whitefield,	G. M. Clement.

## GRAFTON COUNTY.

Alexandria,	H. L. Phillips, R. F. D., Bristol.
Ashland,	L. G. Fifield.
Bath,	William H. L. Reed.
Benton,	L. H. Parker.
Bethlehem,	Thomas Trudeau, Pierce's Bridge.
Bridgewater,	A. H. Carpenter, R. F. D. No. 2, Plymouth.
Bristol,	Ira B. Burpee.
Campton,	E. K. Avery.
Canaan,	A. W. Hutchinson.
Dorchester,	George W. Rowen, Cheever.
Easton,	C. A. Young.
Ellsworth,	B. O. Avery.
Enfield,	Joseph Pillsbury.
Franconia,	E. B. Parker.
Grafton,	A. F. Hoyt.
Groton,	Charles A. Davis.
Hanover,	H. W. Barnes, East Lyme.
Haverhill,	E. M. Clark, Pike.
Hebron,	Harry S. Morgan.
Holderness,	R. P. Sanborn, R. F. D. No. 4, Plymouth.

Landaff,	Charles M. Gale, R. F. D., Lisbon.
Lebanon,	Roy W. Joslyn.
Lincoln,	George E. Henry.
Lisbon,	A. H. Ash.
Littleton,	Albert E. Strain.*
	W. H. Shea.
Livermore,	James C. Donahue, Livermore Mills.
Lyman,	Al F. Parker, R. F. D., Lisbon.
Lyme,	✓ George A. Pushee, Lyme Center.
Monroe,	✓ Oscar Frazer.
Orange,	Charles H. Ford.
Orford,	Charles L. Bean.
Piermont,	J. E. Chandler.
Plymouth,	F. F. Blake.
Rumney,	George D. Kidder, Rumney Depot.
Thornton,	W. P. Van Housen, West Thornton.
Warren,	A. N. Batchelder.
Waterville,	Joseph L. Tuttle.
Wentworth,	Freeman B. Ellsworth.
Woodstock,	E. E. Woodbury.

## HILLSBOROUGH COUNTY.

Amherst,	W. W. Sloan.
Antrim,	Charles D. White.
Bedford,	Gordon Woodbury.
Bennington,	G. S. Holt.
Brookline,	F. L. Willoby.
Deering,	James F. Lock, East Deering.
Fracestown,	Arthur E. Holt.
Goffstown,	✓ George L. Eaton, Grasmere.
Greenfield,	Fred B. Atherton, R. F. D., Lynde- borough.
Greenville,	V. L. Parker.
Hancock,	William W. Hayward.
Hillsborough,	Dana Bruce.
Hollis,	✱ Lester J. Hayden, R. F. D., Brook- line.

\* Resigned.

Hudson,	James E. Merrill.
Litchfield,	C. B. Campbell, R. F. D. No. 1, Hudson.
Lyndeborough,	Jacob A. Woodward.
Manchester,	Oscar Stone.
Mason,	C. B. Goodwin.
Merrimack,	Bert L. Dutton, Thornton's Ferry.
Milford,	W. L. Winslow.
Mont Vernon,	Charles Raymond.
Nashua,	Charles F. Whitney.
New Boston,	Henry E. Fox.*
	John W. Purington.
New Ipswich,	A. E. Chase.
Pelham,	F. M. Woodbury.
Peterborough,	✓ T. E. Driscoll.
Sharon,	Alpha Wilson, Peterborough.
Temple,	J. W. Edwards.
Weare,	F. E. Cutting, East Weare.
Wilton,	Frank Proctor.
Windsor,	J. R. Nelson, Hillsborough Upper Village.

## MERRIMACK COUNTY.

Allenstown,	Napoleon Poulin, Suncook.
Andover,	E. C. Perkins.
Boscawen,	Samuel N. Allen.
Bow,	Frank D. Clough, R. F. D. No. 3, Concord.
Bradford,	F. H. Gillingham.
Canterbury,	L. T. Mason.
Chichester,	✓ W. L. Langmaid.
Concord,	David J. Adams.
Danbury,	✓ E. A. Farnum.
Dunbarton,	Ernest Murphy.
Epsom,	Walter J. Philbrick.
Franklin,	James Huntoon.

\* Resigned.

Henniker,	H. A. Tucker.
Hill,	Clyde A. Blake.
Hooksett,	Edwin A. Tyrrell.
Hopkinton,	✓W. H. Milton, Contoocook.
Loudon,	✓Arthur K. Marston.
Newbury,	Mark Muzzey.
New London,	✓Ira S. Littlefield.
Northfield,	A. F. Cunningham, R. F. D., Tilton.
Pembroke,	Rufus B. Robinson.
Pittsfield,	David O. Sherburne.
Salisbury,	E. D. Little.
Sutton,	✓H. L. Pillsbury, North Sutton.
Warner,	Jesse M. Downes.
Webster,	Harris Goodwin, R. F. D. No. 16, Penacook.
Wilmot,	✓F. E. Goodhue.

## ROCKINGHAM COUNTY.

Atkinson,	✓J. H. Smith.
Auburn,	Fred H. Hall.
Brentwood,	G. R. Rowe.
Candia,	Charles P. Robie, R. F. D. No. 1, Manchester.
Chester,	A. H. Wilcomb.
Danville,	Herbert E. Colby.
Deerfield,	✓Howard King, R. F. D., Raymond.
Derry,	H. W. Bagley.
East Kingston,	✓D. M. Evans.
Epping,	✓James D. Whittemore.
Exeter,	George H. Carter.
Fremont,	Harry S. True.
Greenland,	W. A. Odell.
Hampstead,	Charles F. Adams.
Hampton,	C. S. Toppin.
Hampton Falls,	E. G. Shaw.
Kensington,	□ J. W. Purington, R. F. D., East Kingston.

Kingston,	William A. Bakie.
Londonderry,	✓ J. E. Ray.
Newcastle,	J. O. White.
Newfields,	J. S. Gray.
Newington,	J. M. Hoyt.
Newmarket,	Daniel J. Brady.
Newton,	A. W. Sargent.
North Hampton,	Otis S. Brown.
Northwood,	F. C. Giles.
Nottingham,	P. B. Batchelder.
Plaistow,	F. P. Hill.
Portsmouth,	J. D. Randall.
Raymond,	L. W. Holmes.
Rye,	C. D. Locke.
Salem,	Henry P. Taylor.
Sandown,	J. F. Sargent, R. F. D. No. 3, Ches- ter.
Seabrook,	F. W. Chase.
South Hampton,	✓ C. M. Evans.
Stratham,	✓ J. F. Emery.
Windham,	J. W. Denſmore.

## STRAFFORD COUNTY.

Barrington,	Walter Buzzell.
Dover,	George E. Varney.
Durham,	F. P. Morrison.
Farmington,	Fred P. Fletcher.
Lee,	G. A. Dudley.
Madbury,	✓ W. H. Knox, R. F. D. No. 5, Dover.
Middleton,	L. E. Tibbetts.
Milton,	✓ F. P. Jones, Union.
New Durham,	Grover C. Hayes.
Rochester,	H. C. Hanson.
Rollinsford,	C. E. Lord, Salmon Falls.
Somersworth,	E. A. Farley.
Strafford,	✓ George P. Foss.



## SULLIVAN COUNTY.

Acworth,	✓ W. O. Kemp.
Charlestown,	G. L. Richardson.
Claremont,	C. E. Sears.
Cornish,	James B. Chadbourne, Cornish Flat.
Croydon,	F. W. Putnam.
Goshen,	✓ George F. Crane.
Grantham,	✓ Perley Walker.
Langdon,	G. H. Royce.
Lempster,	✓ F. A. Barton.
Newport,	✓ George E. Lewis.
Plainfield,	Louis E. Shipman, Cornish.
Springfield,	N. J. Gardner.
Sunapee,	✓ F. M. Sargent.
Unity,	James W. Handly, R. F. D., Claremont.
Washington,	✓ J. W. Woods.

## UNINCORPORATED PLACES, COOS COUNTY.

Bean's Purchase,	George Howland, Crawford's, N. H.
Cambridge,	A. E. Bennett, Errol.
Crawford's Purchase,	P. J. Martin, Bretton Woods.
Dartmouth College Grant,	Philip W. Ayres.
Dix's Grant,	} F. W. Noyes, Dixville Notch.
Dixville,	
Erving's Grant,	} Harry Houston, Diamond Ponds.
Kilkenny,	George E. Webster, Lancaster.
Low & Burbank's Grant,	William Kennedy, Gorham.
Millsfield,	George O. Maxwell, Errol.
Odell,	✓ M. J. Hayes, Groveton.
Success,	C. S. Bean, Berlin.
Webster and Hubbard Grants,	M. L. Hilliard, Pittsburg.

## THE FOREST FIRE WARDEN SERVICE.

## FIGHTING FIRES.

Most of the wardens have done very effective fire fighting, particularly on account of the promptness with which they respond to fire calls. To prevent large damage it is important for the fire warden to begin work as soon as possible after the fire starts. It is also a matter of great importance after a fire is under control to keep it well guarded until it is entirely out. A great many disastrous fires have resulted from old fires which were thought to be entirely extinguished, but have smouldered for days and even weeks only to burst out again with tremendous violence by a strong wind. In both of these particulars the fire warden service has been effective, especially in the more settled parts of the state, where help could be quickly summoned. In sections of the state where fires are frequent the wardens have found it necessary to make arrangements with persons living in different parts of the town to summon help and begin work immediately in case of fire, the warden assuming charge when he arrives.

Various methods of fighting fires have been developed according to the needs of different sections of the state. In the mountain region, where a large accumulation of duff makes ground fires particularly hard to extinguish, the digging of trenches with a strong shovel or a very heavy hoe has been found effective. On sandy lands long-handled shovels are used to throw dirt on the fire as it approaches. Where the tree growth is scattered and grass land intervenes over which a surface fire will run, three to five gallons chemical extinguishers are used to good advantage. When a fire is driven by a strong wind and advances rapidly through the tops of the trees, back firing often becomes necessary. The back fire is also used where trenching is difficult and where other means of fighting are not available. A great many wardens use this method of fighting effectively. It

is not advisable, however, unless enough men are at hand to keep the back fire under control.

The woodland in the immediate vicinity of the larger cities suffers considerably from fires. Here the city fire departments handle forest fires, the chief or one of his assistants being appointed forest fire warden. Some very effective fire fighting is done. An example of this is the city of Manchester, which recently purchased an automobile chemical at a cost of \$5,500. This machine is used for both forest and house fires. It carries a thirty-five gallons chemical tank, two pony extinguishers, eight men, and shovels and other tools necessary for fighting fires. It can cover a distance of several miles in a few minutes, in most cases arriving before the fire has gained much headway.

Some cities and large towns have a great many brush fires every year. In most cases a special signal is used and the firemen respond as to other fires. However, the good work of the forest fire wardens cannot prevent fires from starting, and a fire that could be easily extinguished by one man soon after it starts may have gained such headway by the time the fire warden arrives that a crew of fire fighters cannot prevent it from running over a large area. The appointment of several deputies in different parts of the town and several storehouses located at convenient places, where fire-fighting tools are kept, would permit quicker action. In very bad fire districts a wagon fitted with chemical extinguishers and tools should be kept ready for use.

#### POSTING FIRE NOTICES.

In July, 1909, the printing of ten thousand cloth fire notices was ordered. These notices promulgated the law in regard to the setting of fires and asked the coöperation of citizens in making it effective. As soon as they could be secured the notices were sent to the forest fire wardens, eight thousand being distributed during the summer and fall of 1909. In the spring of 1910 five thousand more were

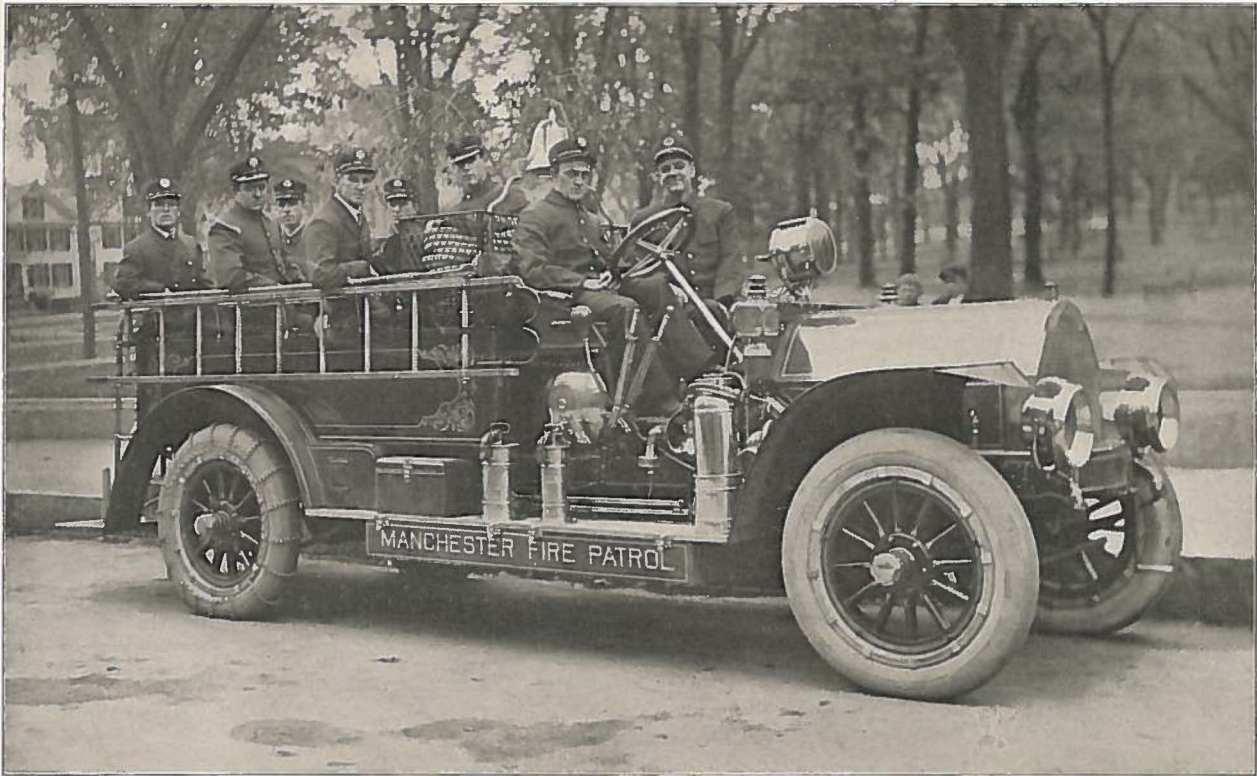


PLATE V.—MANCHESTER'S FLYING SQUADRON. AUTOMOBILE CHEMICAL, USED BOTH FOR CITY AND FOREST FIRES.

printed. A great many notices have been sent to landowners and the supply at present is nearly exhausted. Persons desiring to post their land may secure notices from the town forest fire wardens. Up to September 1, 1910, about twelve thousand had been posted in the state.

#### PERMITS FOR SETTING FIRES.

It is unlawful (section 12, page 43) to set a fire upon any land without the consent of the owner or his agent. Although this provision is little regarded at present, the posting of fire notices and activity of forest fire wardens are bringing it to the attention of those who frequent the woods. Numerous inquiries have been received in regard to the setting of campfires, and it seems but a matter of persistent effort until the great majority of campers, fishermen, and hunters will be more careful about the use of fire. In the unincorporated towns an employee of the owner is usually appointed forest fire warden, who then has full power over the setting of campfires on the property.

Section 13 of the recent law prohibits the burning of brush in or near woodlands in times of drought without the written permission or presence of the forest fire warden. This statute has proved to be a wise enactment. It is not observed in all the towns, but people are rapidly becoming acquainted with the restriction and recognize its merit. Since about twenty percent of our forest fires are caused by brush burning, some check must be placed upon it. Some of the wardens have had trouble at first to get people to observe this law, but in nearly every town, when the people fully understood the spirit of the law, they will invariably apply to the warden for permission before setting fires. One warden during the summer of 1910 received over a hundred applications, and there is no doubt but that the enforcement of the law has prevented considerable damage and expense. Some fires have been started without the warden's permission, the claim being made that it was not a time

of drought. In view of the difference of opinion as to what constitutes a time of drought, it would seem advisable to fix by law the dates between which fires cannot be set without the warden's permission.

#### VIOLATIONS OF THE LAW.

Section 15 gives the forest fire warden power to arrest without a warrant any person taken in the act of violating any of the laws for the protection of forest lands. Unless a warden spends a great deal of time patrolling the woods it is unlikely that he will take anyone in the act of violating the forest laws. In this connection a case has been deemed worthy of mention, although it occurred after the end of the last fiscal year. On September 28, 1910, five men from Manchester were arrested for setting fires in Hooksett, by the fire warden, Mr. E. A. Tyrrell. They were taken before a justice and each fined, the fines and costs amounting to \$14.57 per man. The damage done by the fires was inconsiderable and the example furnished by the fining of persons for the setting of fires illegally will tend to make others careful.

Section 11 makes it the duty of the forest fire warden to report to the county solicitor cases in which he has reason to believe that a forest or brush fire has been set unlawfully. The county solicitor then prosecutes it if he deems the evidence sufficient. A brief statement of some of the instances reported is here appended:

#### CONCORD.

In July, 1909, a fire was started for the purpose of clearing land. The owner was warned not to set the fire. The weather had been very dry for several weeks, but a light shower fell shortly before the fire was set. It cost the city of Concord and the town of Boscawen nearly \$400 to extinguish the fire. Mr. D. J. Adams, the fire warden, brought the facts before the county solicitor, who

did not think the evidence sufficient and hence did not take action to recover the penalty.

This case illustrates the necessity of defining by statute the dates between which fires cannot be set without a permit. The shower, which was not heavy enough to prevent the fire from spreading, enabled the owner to escape trial, inasmuch as the county solicitor thought it could not be proved that the fire was set in a time of drought.

#### KEENE.

In the fall of 1909, in a very dry time, a fire was set without the permission or the presence of the forest fire warden, Mr. Louis A. Nims, who promptly brought the matter to the attention of the county solicitor.

The fire did not escape beyond the owner's property, but to extinguish it cost the city of Keene a little over \$150. After a hearing in court, the owner agreed to reimburse the city. This directed the attention of the people in the vicinity to the fact that the forest fire warden's permission must be secured to burn brush in a time of drought.

#### AMHERST, HOOKSETT, MILFORD.

In the summer of 1910, four persons in Amherst, two in Hooksett, and two in Milford were taken into police court upon complaint of W. W. Sloan, E. A. Tyrrell, and W. L. Winslow, forest fire wardens respectively. They were charged with the careless setting of fires and were bound over to the fall term of court.

It is gratifying to note that the forest fire wardens, by their activities, are increasing the respect for the forest fire laws. To make these laws produce the best results, it is necessary to bring the citizens of the town into accord with them. This requires tactful judgment on the part of the warden. He must be reasonable and lenient until his townspeople understand the spirit of the law and that he is working for their best interest. He must also be fearless when arrests are necessary.

## WARDENS PROVIDED WITH BADGES.

The wardens should be clothed with all the authority necessary to enable them to carry out the law. For this reason, badges have been made and sent to all the wardens. A cut of the badge is here shown.



FOREST FIRE WARDEN'S BADGE.

## MEETING OF FOREST FIRE WARDENS.

Since the organization of the forest fire service under the new law, the commissioners and the forester have realized the value of keeping in close touch with the forest fire wardens and keeping the wardens in touch with each other. It was felt that this could be accomplished by holding annual fire warden meetings, where all could become acquainted and profit by the exchange of ideas relative to the fighting and prevention of forest fires. It was realized, however, that this would be asking too much of the wardens, as there were no funds available for paying their traveling expenses to such meetings.

The Society for the Protection of New Hampshire Forests, through its forester, Mr. P. W. Ayers, extended the Forestry Commission an invitation to hold one of its meetings in connection with the meeting of the society at Bretton Woods on August 2, 1910, and suggested that a meeting of the fire wardens be called at that time. The com-



mission, not being able to meet the wardens' expenses, could not request their attendance, but gladly joined with the society in sending them an invitation. Wardens representing the following towns attended: Concord, Lancaster, Dartmouth Grant, Success, Hinsdale, Haverhill, Whitefield, Livermore, Landaff, Milford, Woodstock, and Conway. Most of those attending traveled long distances and deserve great credit for the interest shown in their work.

Besides the wardens, a number of foresters were present from other states, as were others interested in forest protection. The meeting exceeded expectations in the practical ideas that were brought out. The proceedings have since been printed, and will be mailed to anyone upon application.

At the close of the meeting it was the unanimous opinion of all present that annual forest fire warden meetings should be held in different sections of the state. This would enable the wardens to attend the meetings with less inconvenience and expense.

#### SPARK ARRESTERS ON PORTABLE STEAM SAWMILLS.

The following amendment to Chapter 97, Laws of 1905, was passed at the last session of the General Court:

(Amendment to Chapter 97, Laws of 1905.)

SECTION 1. No person, except when the ground is covered with snow, shall operate within any city or town any portable steam-mill unless the same is provided with a suitable spark arrester, approved by the state forest fire warden. Such approval shall be in writing, signed by the fire warden, and said approval may be revoked by said fire warden in the same manner.

SECT. 2. It shall be the duty of the fire warden to examine all portable steam-mills, whenever he deems it necessary, to determine whether they are provided with suitable spark arresters, and whether the same are kept in constant use, as provided for by section 1 of this act.

SECT. 3. Any person operating a portable steam-mill when the ground is not covered with snow, without a suitable spark arrester and the approval of the fire warden, as herein provided, and any owner or part owner of said mill knowingly permitting its operation, shall be fined not less than fifty dollars and not more than one hundred dollars.

SECT. 4. All acts and parts of acts inconsistent with this act are hereby repealed, and this act shall take effect upon its passage.

Inasmuch as the Laws of 1905 were repealed it is recommended that the above be reenacted as a separate act or as an amendment to the present laws.

On account of the time required it was deemed inexpedient for the forester to visit all the portable steam-mills in the state to determine whether or not each one was equipped with a suitable spark arrester. The forest fire wardens were therefore asked to send in the names of the mill owners and operators. A letter was then sent to each one enclosing a question blank to be filled out giving a description of the arrester being used. Each answer was carefully considered, and if the arrester did not seem satisfactory the operator was so advised. If the arrester met the requirements a permit to operate was issued for so long a time as the proper conditions were fulfilled or until further notice.

The reports and replies showed a general compliance with the law. There are about 125 portable steam sawmills operating in New Hampshire at the present time. Most of them have been using spark arresters and are careful with fire. Forest fire reports show that between September 1, 1909, and August 31, 1910, only six fires were caused by sparks from portable mills.

#### COST OF FIGHTING FOREST FIRES SHARED EQUALLY BY THE STATE AND THE TOWNS.

The new forestry law provides that the expenses incurred in fighting forest fire shall be shared equally by the towns or cities and the state, and that the forest fire wardens shall

make reports to the State Forester. The method of carrying this out is as follows: The forest fire warden has charge of all forest and brush fires. When a fire is extinguished he makes a report of it to the State Forester, stating the cause of the fire, the area burned, damage done and other desired information. He then presents to the selectmen or the mayor a bill of the expense incurred in fighting the fire. This bill, when approved, is paid by the town or city and a duplicate, signed by the warden, the selectmen or mayor, and the town or city treasurer, is then sent to the forester, who draws his order on the State Treasurer for the portion of the bill for which the state is liable.

Most of the wardens are prompt about making reports. The bills, however, are not taken care of so quickly, as most boards of selectmen wait until a regular meeting before acting on them. It sometimes happens that men employed in fighting forest fires are not paid for several months after the services are performed. This makes it hard for the warden, as he can get more willing help if bills are paid promptly. Some wardens have adopted the plan of sending the selectmen a list after each fire of the men employed in putting it out, stating the amount due each man; the men then go to the selectmen for their pay. Other wardens pay the men in the first place and then render an itemized bill to the selectmen.

The appropriation for carrying the forestry law into effect is \$8,000 per year. The maintenance of the present department requires about \$4,000 per year, leaving \$4,000 to pay the state's share of expenses incurred in fighting forest fires in the towns and cities. Since the state pays one half the expenses, this would permit an expenditure of \$8,000 per year for fighting fires. During the past year, which has witnessed somewhat more than the average fire damage in the southern counties and very much less than the average in the north, the state paid to the towns and cities \$3,349.94, representing a total fire fighting expense of \$6,699.88. In 1908, which was a bad fire year, the fire fighting expenses

for a period of only six weeks in the fall amounted to over \$7,000, and for the whole season of 1908 they were about twice the present appropriation. In a bad fire season, like the one which occurred in the spring of 1903, the present appropriation would be exhausted within a few weeks.

Realizing that they were not prepared financially to meet a season of disastrous fires, the Forestry Commission asked the opinion of the Attorney-General as to the possibility of authorizing expenses beyond the state appropriation should such a contingency arise. He gave the opinion that this could not be done. It therefore became necessary for the commission to make regulations to prevent the forest fire wardens from involving the state in expenses beyond the amount appropriated. The State Forester was directed to limit the expenses that might be incurred in the name of the state to fifty dollars unless the warden obtained the permission of the State Forester to spend more. It was calculated from the average cost of fires that this would keep the expenses within the amount appropriated.

The above plan has worked out well in practice. The wardens as a rule go ahead and extinguish the fires whether the expense exceeds fifty dollars or not. They then render a bill to the selectmen and it is paid by the town. The bill is then sent to the State Forester and is approved if it is less than fifty dollars and one half refunded to the town. If the bill is greater than fifty dollars, then twenty-five dollars (the state's share of the expenses authorized) is paid, a record being kept of the remainder. At the end of the fiscal year, the bills in excess of fifty dollars are taken up and balances paid with whatever remains of the unexpended appropriation. For the last fiscal year there was enough to pay balances on all bills received.

Table VII shows the cost of fighting forest fires during the past two years as reported by the forest fire wardens. The present law, providing that the state should pay one half, did not take effect until May 1, 1909. Hence, in the first column there is no item of state expense.

TABLE VII.

COST OF FIGHTING FOREST FIRES AS REPORTED BY THE FOREST FIRE WARDENS.

BY WHOM PAID.	Sept. 1, 1908 to April 30, 1909	May 1 to Aug. 31, 1909	Sept. 1, 1909 to Aug. 31, 1910
Towns and Private Owners.....	\$7,123	\$1,733.48	\$3,349.94
The State .....	.....	1,733.48	3,349.94
Totals .....	\$7,123	\$3,466.96	\$6,699.88

## THE MOUNTAIN LOOKOUT SERVICE.

The present forest fire law, while it works well in the southern part of the state, and, with a few changes, will be sufficient protection for the woodlot region, is altogether inadequate to protect the large areas of wild land in the mountain region. On account of the scarce population a fire may burn for a long time before being discovered. There are fewer roads or other breaks in the forest from which a fire can be successfully fought. On account of the rough topography it is hard to get a crew on the ground after a fire starts, and slower work fighting. There are fewer fires in the mountain region than in the southern part of the state, but the average mountain fire burns over more territory and does more damage.

An idea of the different conditions in the two regions is gained by comparing the fires that have occurred in Carroll, Coös, and Grafton counties with those that have occurred in the remainder of the state. Within the last two years there have been only 76 fires reported in the three upper counties, while in the other seven counties 394 were reported. The average fire in the north, however, burned over 137 acres and caused \$619 damage; while the average fire in

the southern counties burned only 30 acres, causing \$168 damage. The fires in the south were discovered soon after they started and were easier to extinguish.

An adequate system of fire protection for the northern region must be one that prevents fires or at least prevents them from getting under great headway. For this purpose mountain lookout stations have been used with considerable success in Maine, New York, and in the national forests of the West. A mountain commanding a good view of the surrounding timberland is selected for the purpose and a telephone line built to the top. A watchman is kept on the mountain whenever there is danger of fire. He has field glasses, maps, a compass, and a range finder. As soon as a fire is discovered the watchman immediately telephones the nearest forest fire warden, or other person in charge of fire fighting, telling him the location of the fire and the easiest way to get there.

Two lookout stations have been maintained by timberland owners in New Hampshire for several years. The Mount Pleasant Hotel Company has long maintained a patrol over the Rosebrook range in times of drought, a telephone line having been built to the top of Mt. Rosebrook, the best lookout point. A station has also been maintained on Croyden mountain by the Draper Company and the Blue Mountain Park Association. Both these operators expected to continue their work this season and were glad to cooperate with the commission. The forester, therefore, furnished each with the names and telephone connections of all forest fire wardens in the territory surveyed by each mountain, and since then fires have been promptly reported to the wardens.

During August, 1909, it became evident that the four thousand dollars appropriated up to September 1, 1909, would not be all used on account of the fact that many towns were not sending in their forest fire bills promptly. The money left over could not be held for payment of bills, and the commission therefore applied to the Governor and

Council for authority to use part of this money in purchasing equipment for mountain lookout stations. The request was granted, and telephone wire, fixtures, and instruments enough to equip five stations were purchased. Aside from this initial expense of \$599.39 no state money has been used for any of the lookout work.

No money from the state appropriation could be used for building or maintaining these stations. The money which had been placed at the disposal of the commission by Mr. R. E. Faulkner was used for this purpose, and in the fall of 1909 a station was built on Mt. Kearsarge. This mountain overlooks the towns of Conway, Eaton, Madison, Albany, Bartlett, Jackson, and Chatham, and parts of other towns. Since its establishment twenty-six fires have been discovered and reported by the watchman.

#### TIMBERLAND OWNERS CONTRIBUTE FOR LOOKOUT STATIONS.

Realizing the need of a better protective system than could be furnished under the present law, the commission requested the large timberland owners to meet them at Gorham, N. H., on March 30, 1910, for a discussion of the best means of securing fire protection.

The response was gratifying and clearly showed that the timberland owners are awake to the serious effect of fire on the future timber crop, the attendance representing an ownership of over one million acres. At this meeting Mr. W. T. Cox of the United States Forest Service outlined the fire protection work of the government and the timberland owner's protective associations in the West; Hon. E. E. Ring explained the system of fire protection used in Maine; Mr. Austin Cary was unable to be present but sent a paper covering the methods used in New York, and Mr. Austin Hawes spoke of the fire situation in Vermont. The State Forester then outlined the work done in New Hampshire under the present forest fire law, after which the better protection of our timberlands was thoroughly discussed by the owners.

As a result of this meeting the timbermen contributed \$4,100 toward the immediate building of lookout stations, and appointed a committee to consider the advisability of forming a permanent association for the purposes of fire protection. The contributions of individuals and corporations are given in the financial statement of this report.

#### LOOKOUT STATIONS ESTABLISHED.

With this money lookout service was established on ten mountains, making thirteen in all. The location of these stations is shown on the accompanying map. On Mt. Moosilauke, Mt. Agassiz, and Mt. Madison telephone lines were already installed, the only expense being the employment of a watchman. On Mt. Aziscoos, which is operated by the State of Maine, an arrangement was made whereby fires occurring in New Hampshire were reported to the wardens, and in return fires in Maine were reported if discovered from New Hampshire lookouts. On Mts. Magalloway (Pittsburg), Sugar Loaf (Stratford), Signal (Millsfield), Black (Cambridge), Pine (Gorham), Carrigain (Livermore), and Osceola (Waterville), it was necessary to build telephone lines and construct camps.

#### THE VALUE OF MOUNTAIN LOOKOUT STATIONS.

Most of the New Hampshire lookouts were constructed late in the summer of 1910 and used only for a short time. A few, however, were in use during the spring, summer, and fall. Five of these stations proved the value of this method of fire protection. In all 44 fires were reported as follows: Mt. Agassiz, 2; Mt. Moosilauke, 5; Mt. Madison, 3; Croydon Mt., 8, and Mt. Kearsarge, 26.

A lookout station is not always available on account of clouds cutting off the view of the observer. On the other hand, the fire danger is most imminent in periods of drought, when the air is usually clear. On account of the number of cloudy days which occur on the very high peaks and also



**ESTABLISHED STATIONS**

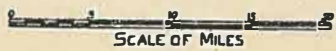
1. Mogalloway Mountain
2. Aziscoos Mountain—operated by Maine
3. Sugar Loaf
4. Signal Mountain
5. Black Mountain
6. Pine Mountain
7. Mt. Rosebrook
8. Mt. Madison
9. Mt. Agassiz
10. Mt. Moosilauke
11. Mt. Kearsarge—North
12. Mt. Carrigan
13. Mt. Osceola
14. Mt. Croydon (operated by Corbin Park Ass'n and Draper Co.)

**PROPOSED LOCATIONS**

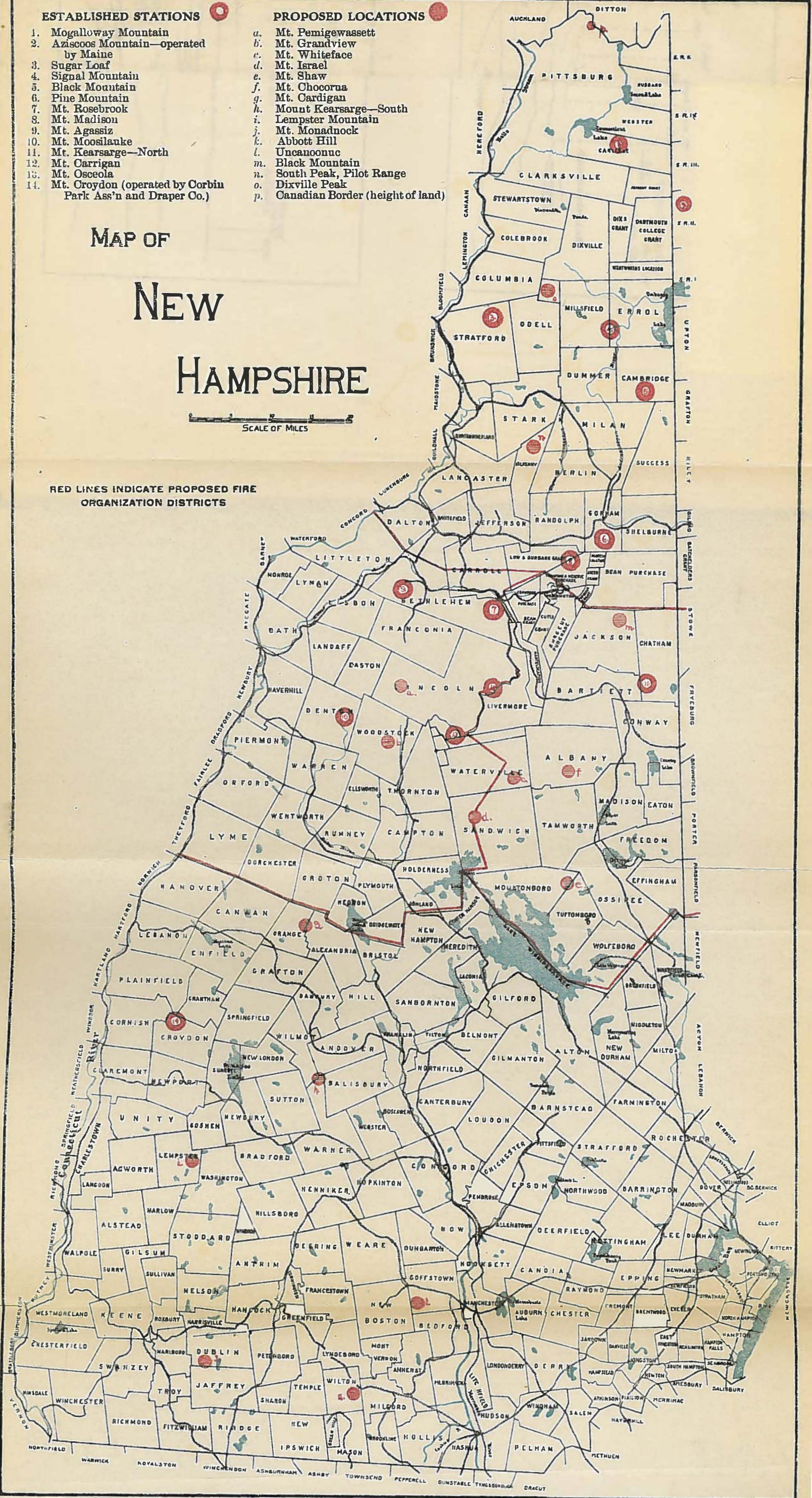
- a. Mt. Pemigewasset
- b. Mt. Grandview
- c. Mt. Whiteface
- d. Mt. Israel
- e. Mt. Shaw
- f. Mt. Chocoma
- g. Mt. Cardigan
- h. Mount Kearsarge—South
- i. Lempster Mountain
- j. Mt. Monadnock
- k. Abbott Hill
- l. Uncanoonuc
- m. Black Mountain
- n. South Peak, Pilot Range
- o. Dixville Peak
- p. Canadian Border (height of land)

MAP OF

# NEW HAMPSHIRE



RED LINES INDICATE PROPOSED FIRE ORGANIZATION DISTRICTS



from the increasing amount of haze in the air the mountains of less altitude seem better adapted to serve as lookout points.

The value of the lookout station is greatly increased if the watchmen are provided with good maps of the surrounding country so that any visible smoke can be accurately located. Maps such as the one shown in Plate X should be made for the country around each lookout station, also panoramic maps should be made showing all the hills and mountains visible from each station. Plate IX shows the panorama around Mt. Moosilauke. This is the only mountain for which such a map could be secured.

Two notable cases showing the value of the lookout service in New Hampshire are worthy of mention.

#### CONWAY.

On July 17, 1910, a fire was set in a heavy pine slash only a short distance from the Kearsarge postoffice. It was supposed to have been started by a careless smoker, and was in a dangerous place, as a number of buildings and young growth pine were close at hand. The watchman on Mt. Kearsarge saw the first curl of smoke, and immediately telephoned the forest fire warden, who summoned help and was on the ground before most of the people in the immediate vicinity knew of the fire.

Four hours hard fighting sufficed to extinguish the fire. Considerable damage was done to young pine, but the promptness of the lookout man and fire warden saved a great deal of property.

#### LANCASTER.

On August 30, 1910, a fire was started in the south part of the town for the purpose of clearing land. The fire was seen from Mt. Agassiz, a distance of twelve miles. The forest fire warden was notified immediately and started for the fire. He arrived within two hours from the time the fire started, and was able to prevent the fire from doing any particular damage.

There was a dense growth on two sides of the field where the fire started. Had it not been for the prompt discovery by the watchman and the quick action of the fire warden the fire no doubt would have reached the woods and caused a great deal of damage and expense.

#### MORE LOOKOUT STATIONS NEEDED.

The mountain lookout service in New Hampshire and other states has undoubtedly proved its worth. It should be extended so that all wild land may be under observation in times of drought. On Plate VIII the locations of proposed stations are shown. There should be seven or eight more established in the northern part of the state. One is needed near the Canadian boundary to overlook the country north of the Connecticut lakes. It is probable that arrangements could be made with the Province of Quebec to share in maintaining such a station. Dixville peak commands a good view, and a station is needed on one of the peaks of the Pilot range. One station is needed which commands the entire main valley of the Pemigewasset, looking into the Franconia Notch. Mts. Grandview or Pemigewasset would serve this purpose. On the east side of the state a large area of country is not yet covered by lookouts. Black mountain in Jackson would cover the Wild river valley and some parts of Jackson that cannot be seen from Mt. Kearsarge. Farther south, a lookout is needed to cover Sandwich, Tamworth, and a part of Albany. For this purpose Mt. Whiteface is perhaps best situated, although Mt. Israel and Mt. Chocorua cover wide ranges of territory. If a lookout is needed in the lake region, Mt. Shaw would probably be the best point of observation.

[F]or the central and southern parts of the state it is doubtful if lookout stations will prove so valuable as they do in the north. The forest is more broken and the denser population enables fires to be apprehended sooner after they start.] Nevertheless, the Croydon lookout covers a country which is largely a woodlot region and it has proved to be

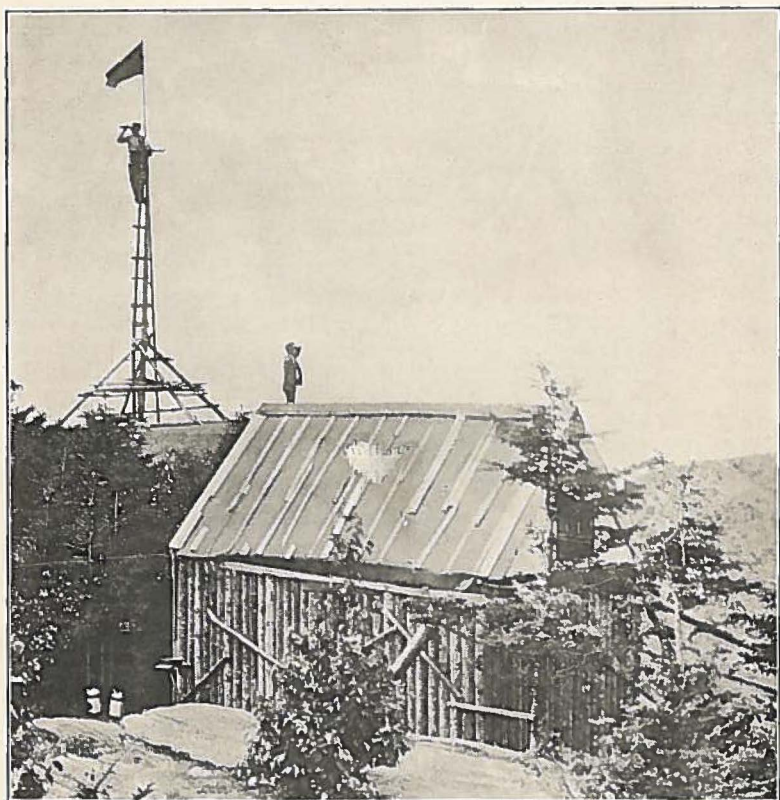


PLATE VII. — FOREST FIRE LOOKOUT STATION ON CROYDON MOUNTAIN,  
CORBIN PARK. ONE OF THE FIRST ESTABLISHED IN NEW HAMPSHIRE.  
(COURTESY OF THE VERMONT FOREST SERVICE.)

very valuable. It must also be remembered that considerable areas of land have been abandoned and grown up to forest, so that there are good-sized tracts of practically unbroken second growth. Then, too, the proximity of the manufacturing cities invites a careless element of our population to traverse the woods, and this largely increases the number of fires. The mountains in this region which have been suggested to the commission as desirable lookout points are shown on the map. Mts. Cardigan, Kearsarge, and Lempster would command good views, but fires have not been frequent in the vicinity of these mountains. The landowners around Monadnock have been considering equipping this mountain for lookout service. It commands a good view and would prove a valuable station. Mt. Uncanoonuc in Goffstown and Federal Hill in Wilton have been suggested by landowners on account of the frequency of fires in the immediate vicinities.

#### FIRES ON CUTOVER LAND.

Although only one fourth the burned area in the state last year was land recently cut over, the cuttings contributed to a great deal of damage. The tops and the limbs scattered in great profusion become very dry and favor the spread of fire. The slash left after softwoods are cut is especially dangerous. In a strong wind it is practically impossible to stop a fire which is burning through a heavy softwood cutting, and a great deal of damage is done every year by fire spreading from cutover land to adjacent areas of young growth and merchantable timber.

The risk in holding growing timber near cutover land is great, and the increasing amount of cutting is constantly putting more growing timber in danger. Several methods of reducing this danger have been developed, such as clearing a fire line around the cut area or piling and burning the brush. The latter method is used to a large extent on the national forests, and some state laws require it.

A very effective and comparatively inexpensive method is that of lopping the branches from the felled tops so the stem of the tree rests on the ground. This is required by law in New York and has been tried with success in other places. When the branches are lopped off, the top and limbs fall to the ground and decay rapidly. Two or three years suffices to remove the danger of fire, which lasts often for ten years or more after cuttings where the branches have not been lopped.

#### CAUSES OF FOREST FIRES.

Table VIII shows the causes of forest fires in New Hampshire for 1909 and 1910, as reported by the forest fire wardens. In 1909 over forty-three percent of all forest fires were reported "cause unknown." In 1910 only twenty-seven percent were so reported. It is evident also from a study of the answers given on the report blanks that the wardens are reporting fires much better than formerly. The figures for 1910 are more reliable than those for 1909. In both years, however, there were numerous fires not reported.

TABLE VIII.

CAUSES OF FOREST FIRES, AS REPORTED BY THE FOREST FIRE WARDENS.

CAUSE.	SPRING AND SUMMER, 1909.		FALL, 1909; SPRING AND SUMMER, 1910.	
	May 1 to Aug. 31.		Sept. 1, 1909, to Aug. 31, 1910	
	Number.	Percent.	Number.	Percent.
Unknown .....	47	43.11	58	27.10
Brush-burning .....	18	16.51	41	19.15
Railroads .....	10	9.17	32	14.95
Smokers .....	14	12.84	27	12.61
Hunters, Campers, Etc...	5	4.59	15	7.0
Incendiary .....	2	1.85	17	7.95
Berry-pickers .....	5	4.59	2	.95
Portable sawmills .....	3	2.75	6	2.80
Lightning .....			6	2.80
Other Causes.....	5	4.59	10	4.69
Totals .....	109	100	214	100

Last year brush burning was the cause of over 19% of the forest fires. This clearly indicates the carelessness with which people set fires to clear land. The fire wardens should be given more authority to reduce the damage from this cause.

Railroad locomotives set about 15% of the fires reported, and it is probable that a large number of fires from this cause were not reported. The most satisfactory means of preventing these fires is by the use of oil burning engines. They are used in the Adirondacks and in parts of the West. In some states fire lines are cleared along the right of way. Spark arresters do not seem to have solved the problem.

Careless smokers caused over 12% of the fires, and hunters, smokers, fishermen, and campers together caused about 20%. Moreover, the fires caused by fishermen are numerous in the spring and those caused by hunters numerous in the fall—the two most dangerous times in the year for fires to start. This emphasizes the need of patrol during the spring and fall.

About 8% of the fires were incendiary. The remaining causes were berry pickers, portable steam sawmills, lightning, and other causes, including blasting, toy balloons, etc. These taken together were responsible for about 11% of the fires.

#### THE FOREST FIRE SERVICE SHOULD BE ORGANIZED BY DISTRICTS.

The experience gained in organizing the forest fire warden service and in building lookout stations during the past year has convinced the commission that no thorough system of fire protection for the whole state can be handled by one man and permit him to give attention in detail to the needs of each section, which is the real work needed.

The state should be divided into at least four districts, according to watersheds, and a chief appointed for each, who shall, under the direction of the commission and the forester, have charge of all forestry work in his district.

The proposed districts are shown on Plate VIII. Since the fires in the southern part of the state are easier to extinguish and most of the work can be handled by the forest fire wardens, one district chief with headquarters in Concord could administer the state work in most of the seven lower counties. A second district would include the western central region with headquarters at Woodsville. A third would embrace the county east of the divide between the Pemigewasset and Saco rivers with headquarters at Conway. The fourth district would include the territory from the Presidential range north to the Canadian boundary, with headquarters at Lancaster.



The district chief should be selected for his integrity, his particular knowledge of the forest conditions in his district, and his executive ability. His principal duties would be to inaugurate fire protective measures and aid the forest fire wardens in his district in getting the best results from the law, but he could perform other duties under the direction of the forester. He could superintend the building of mountain lookout stations, getting the work started in the spring as soon as there is any danger from fires, and stopping the work and reducing the expenses as soon as the danger season is over. He could also coöperate with the local representatives of the railroad companies in the protection of the forest property along the right of way, putting on patrols in dry weather and looking after the construction of fire lines where needed.

A very important duty of the district chief would be to help the forest fire warden in each town to devise better means of fire protection. Deputy forest fire wardens are needed in most towns, and the district chief could help the local warden in securing the services of reliable men in different sections of the town to act in this capacity.

#### SUPPLY STATIONS AND MAPS NEEDED.

In order to render the work done by fire fighting crews more effective, supply stations should be built at advantageous points containing tools and fire fighting apparatus suited to the locality. Provisions could also be kept, and all supplies should be packed for quick transportation.

Forest maps should be made to aid the mountain lookout men in locating fires, and also to help the fire wardens in their work. These maps should be made immediately for the worst fire districts and gradually extended. They should show the hills, streams, ponds, forest growth, burned land, farm land, roads, trails, railroads, telephone lines, tool supply stations, springs where a good supply of water may be obtained, and other information that would aid a fire warden

in using his fire fighting crew to good advantage. By studying the map he could plan out in advance the best method of fighting fires which might occur in any part of the town. Plate IX shows such a map made for the town of Randolph.

The district chief could attend to the building of supply stations and making of forest maps within his district.

## EDUCATIONAL AND CO-OPERATIVE WORK.

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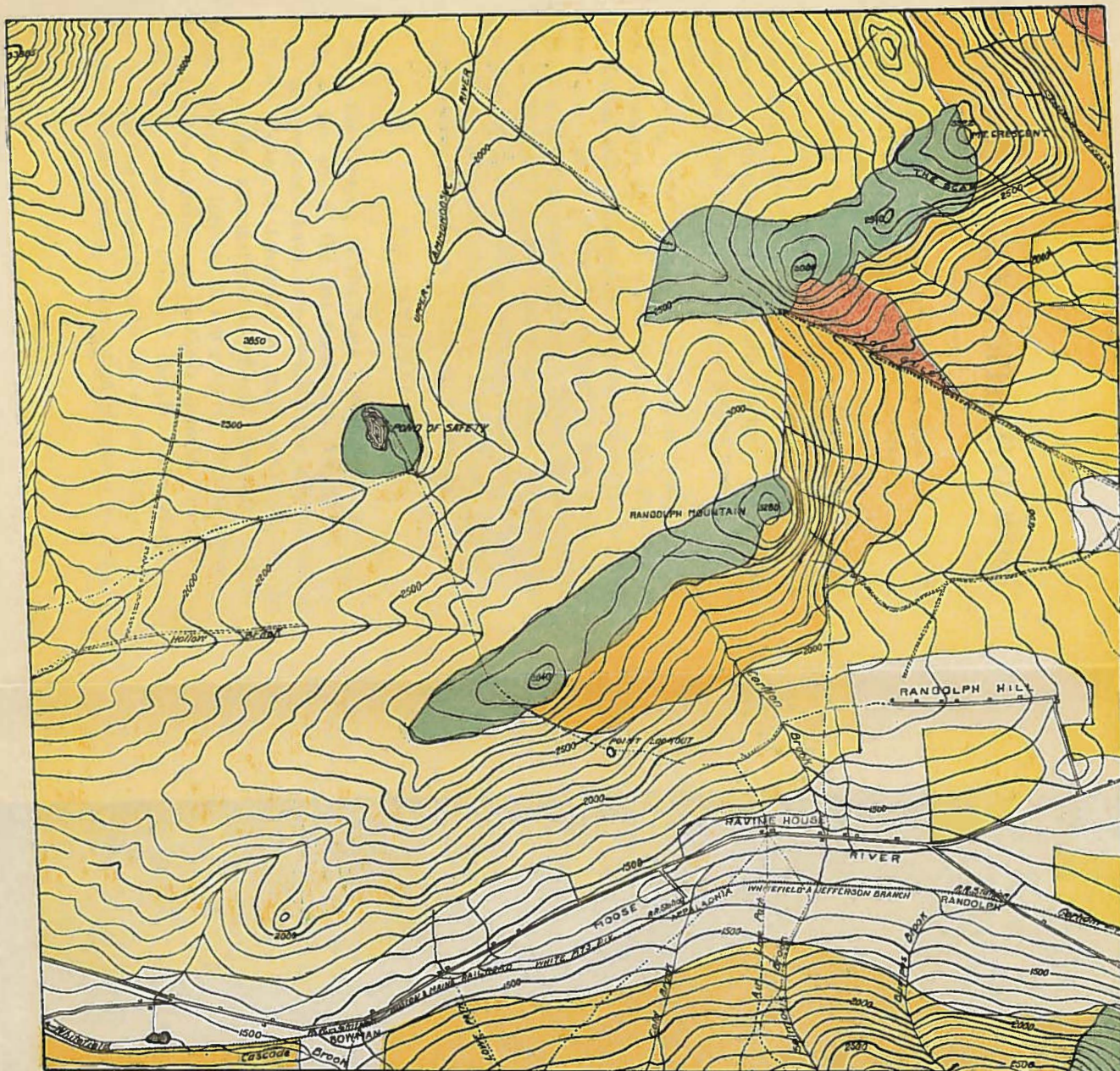
Section 2 of the recent forestry law provides that the State Forester shall "carry on an educational course of lectures at farmers' institutes and similar meetings within the state. He shall, under the supervision of the forestry commission, execute all matters pertaining to forestry within the jurisdiction of the state."

Section 3 provides for coöperation with counties, towns, corporations, and individuals in the proper management of forest land.

In carrying this law into effect it soon became evident that the means at hand would not meet the demands for information and assistance which were being received from landowners. Most of the forester's time was taken up in organizing the fire warden service. Hence the educational work could not be pushed to a point where it would interfere with the fire protection work, and there was only a very limited time for coöperative work. The services performed under these two heads are considered separately.

### EDUCATIONAL.

Since the opening of the State Forester's office, July 1, 1909, to the end of the last fiscal year, August 31, 1910, some 300 requests have been received for information on different phases of forestry. A great many persons desired specific information on forest planting, indicating a widespread interest in the subject. Others wished to know the practicability and methods of making conservative cuttings in different kinds of forests. The rapidity of growth and the proper time to cut certain stands was requested in many cases. Information in regard to fire pro-



**STATE OF NEW HAMPSHIRE  
FOREST MAP—TOWN OF RANDOLPH  
SHOWING FIRE CONTROL CONDITIONS**

1 MILE  
CONTOUR INTERVAL IS 100 FEET  
Taken as from Sea Level

Burned Land - Red  
Clear Cut Land - Light Orange  
Spruce - Light Green  
Spruce - 80% - Light Yellow  
Carrage Roads - Dotted Lines  
Two Wheel Roads - Dashed Lines

**REFERENCES**

Trails and Paths - Dotted Lines  
Streams and Ponds - Blue  
Crops and Meadows - Green  
Churches - Small Squares  
Towns - Villages - Larger Squares and Names

tection, forest taxation, tree diseases, insect pests, and the care of shade trees was also sought.

These requests can be answered much more quickly and satisfactorily by carrying on investigations and publishing the results in bulletins than is possible by correspondence. The New Hampshire Forestry Reports for 1905-06 and 1907-08 contain a great deal of desired information, but the supply of these was limited and is now entirely exhausted. Many of the requests, such as for the growth and financial maturity of certain stands, require extensive field investigations before they can be answered. To serve the applicants a list of publications on forestry dealing with conditions in or similar to those in New Hampshire was made. This list stated the cost of each publication and where it could be obtained, and was mailed to persons requesting information. Specific information was given as fully as possible by correspondence and consultation.

#### BULLETINS ISSUED.

*Forest Laws.* Soon after the establishment of the forester's office all New Hampshire laws relating to forestry were compiled and published. A copy was sent to each forest fire warden, board of selectmen, and to persons applying.

*Collecting Pine Seed.* In August, 1910, a leaflet on the method of collecting white pine seed was published. In several parts of the state the crop of pine seed was abundant this year and this leaflet was sent to persons in these localities interested in forestry.

*Forest Fires.* On August 2, 1910, a meeting of forest fire wardens was held at Bretton Woods. The proceedings of the meeting were published and will be sent to anyone upon application.

The expenses of publishing the last two bulletins were paid from private funds.

## EXHIBITS AT FAIRS.

Since the close of the last fiscal year two fair exhibits have been given—one at Rochester and one at Plymouth. There being no appropriated money available for this purpose, both were financed by private funds.

These exhibits showed seedling trees from one to three years old as grown in the nursery. The trees were planted in boxes filled with sand and cards were printed explaining their growth and cost. Samples of the fruits and seeds of native forest trees were exhibited and pictures and transparencies were used to illustrate different methods of handling the forest. A register book was opened at each fair and about two hundred and thirty signed, expressing their desire to obtain further information on various phases of forestry.

## LECTURES.

The interest in forestry is reflected by the number of lectures and talks which the State Forester has been asked to give. This part of the work is producing good results and should be extended. At most of these meetings a live interest is taken and the questions asked indicate that small landowners are awakening to the practical value of forestry. The most interesting meetings were the most informal ones, where the audience entered into a general discussion of the subject. All of these requests could not be accepted on account of the time taken up in fire protection work. The following engagements were filled, some of the talks being illustrated with lantern slides:

State Board of Trade, Uncanoonuc Hotel, July 13, 1909.

State Board of Agriculture, Hampton Beach, August 3, 1909.

White Mountain Board of Trade, North Conway, September 22, 1909.

State Firemen's Association, Woodsville, September 28, 1909.

Board of Trade, Manchester, October 11, 1909.

New Hampshire Horticultural Society, Peterborough, October 27, 1909.

New Hampshire Association of Academy Teachers, Rockland Academy, West Lebanon, November 5, 1909.

Nashaway Woman's Club, Nashua, November 15, 1909.

Rockland Grange, George's Mills, December 1, 1909.

Sunapee Lake Grange, South Newbury, December 2, 1909.

Sutton Grange, North Sutton, December 3, 1909.

Advance Grange, Wilton, December 8, 1909.

Narragansett Grange, Bedford, December 9, 1909.

Souhegan Grange, Amherst, December 10, 1909.

State Board of Agriculture, Exeter, January 13, 1910.

St. Paul's School, Concord, January 17, 1910.

Board of Trade, Newport, January 18, 1910.

Board of Trade, Charlestown, February 3, 1910.

Board of Trade, Milford, February 10, 1910.

Civic League, Concord, February 22, 1910.

New Hampshire Timberland Owners, Gorham, March 30, 1910.

Board of Trade, Claremont, April 4, 1910.

Reading Club, Canaan, April 11, 1910.

Capital Grange, Concord, April 20, 1910.

Pomona Grange, Nottingham, May 11, 1910.

Pomona Grange, Salisbury, May 12, 1910.

Upper Coös Pomona Grange, Stewartstown Hollow, June 16, 1910.

Pomona Grange, Bath, June 17, 1910.

Haverhill Grange, Haverhill, June 17, 1910.

The Society for the Protection of New Hampshire Forests, Bretton Woods, August 2, 3, 1910.

Intervale Improvement Society, Intervale, August 12, 1910.

#### LECTURES GIVEN AT THE STATE COLLEGE.

In October, 1909, a request came from the faculty of the New Hampshire College of Agriculture and the Mechanic Arts asking the State Forester to give a course of lectures on practical forestry at that institution. This request was

referred to the Forestry Commission, who instructed the forester to comply with the request in as far as he could without neglecting the fire protection work. An arrangement was made whereby a short course of lectures was given, the college assuming the forester's traveling expenses. Nine lectures and two field exercises were given. It was the aim of the course to present the forest conditions which prevail on the pine, hardwood, and spruce lands, and the practical application of forestry to the forest types in each region. Other subjects considered were forest planting and the estimating of pine woodlots.

The forestry interests of New Hampshire would be promoted by providing for a teacher of forestry at the college. Heretofore, courses have been given in forestry by the Professor of Horticulture, who, for lack of time, cannot give it adequate attention. There is a demand among the students for instruction in forestry. Most of the young men taking the agricultural course have the management of New Hampshire farms after graduating. If these young men could be given special instruction in the practical application of forestry to the farm woodlots and waste lands of the state, the profits from their own lands would be increased as well as furnishing examples of intelligent forest management to the communities in which they live.

#### BLIGHTS AND INSECT PESTS.

Since many inquiries are received in regard to tree diseases and insect enemies this brief statement is here appended. The brown-tail and gypsy moths are not mentioned, since they are handled by a different department, to which inquiries on the subject are referred.

Fortunately many of the enemies of forest trees, which have created so much apprehension for the past few years, have become less active and seem to be on the decrease. The green-striped maple worm (*Anisota rubicunda*) and the saddled prominent (*Heterocampa gurivitta*), which did so much damage to the hardwood forests of maple, beech, and



birch, are no longer active in many localities where a year and two years ago they caused complete defoliation of sugar orchards and woodlots. The white pine blight of 1907, which affected the pine needles, and the cause of which has never been fully determined, decreased very much in 1908, and now seems to be passing away. The pine blight of 1908, which affected the twigs, seemed to be caused in some cases by winter killing, in others by insects, and in still others by a fungous disease. These seem to be decreasing, and, except in a few localities where the insect is still at work on the twigs, appears to be passing. The white pine weevil, which a few years ago destroyed so many of the white pine leaders, has done very little damage in 1909 and 1910, except over a few small areas.

#### A NEW WHITE PINE DISEASE.

It is unfortunate that just as the interest in forest planting is developing so rapidly there should be introduced from Europe a disease which may seriously affect our best reforesting tree—the white pine. This disease is known as the European currant rust or European blister rust. It spends part of its life as a rust on the leaves of the currant or gooseberry, and then the spores are carried by the wind to the bark of a white pine, where they germinate and penetrate the inner bark of tender young branches and stems. This causes a thickening of the branch or stem affected and an unnatural swelling, which a little practice enables one to discover. In the spring of the second year after infection orange-colored fruiting bodies appear on the pine, which later burst, allowing spores to escape, which are carried to the currant or gooseberry bushes, and the cycle is repeated.

A large number of foreign white pine seedlings have been imported into New England and New York, and the disease has been discovered in several places. During the summer of 1909, Dr. Perley Spaulding of the Bureau of Plant Industry at Washington examined most of the plantations in New Hampshire which contained foreign seedlings. In the

spring of 1910 Dr. Spaulding and the State Forester inspected several plantations and found a number of pines affected. Information has been received of other plantations made from foreign trees and these will be inspected next spring.

So serious has the disease become in parts of Europe that the growing of white pine has been abandoned. All persons who contemplate planting white pine are strongly urged to use domestic stock. This emphasizes the need of a state forest nursery to supply the increasing demand for seedlings, so that no person in the state will need to import white pines for planting.

#### FOREST TAXATION.

The subject of forest taxation was treated consummately in the New Hampshire Forestry Report for 1907-08. Cooperation was secured with the United States Forest Service, whereby Mr. John H. Foster spent five months in an investigation of the taxation of forest property and made a detailed report on conditions in different parts of the state, with recommendations for improving the system.

Since that time the commission has had neither time nor means to carry on further investigations, and recommends the carrying out of suggestions contained in that report.

#### PROTECTION OF SHADE TREES.

The shade tree law provides for the appointment of tree wardens in each town or city by the selectmen or mayor. The town or city has control over all shade trees in public ways, and it is the tree warden's duty to mark such trees with metal disks provided by the Forestry Commission.

The law, as amended in 1901, provided that, "If any of the trees designated as aforesaid should prove to be private property, and the owners thereof refused to release or convey their interest therein to the municipality, the tree warden shall acquire them for the use of the city or town, by purchase, if it can be done at a fair price. Failing in this he may, on petition for that purpose, acquire them in the same way and manner and with the same right of appeal to their owners as in the case of land taken for a highway."

In 1902 it was decided in the case of Bigelow & a v. Whitcomb & a that such trees could not be taken unless the owner was compensated therefor.

The legislature of 1905 amended the law as follows:

SECT. 3. If any of the trees designated as aforesaid should prove to be private property, and the owners thereof refuse to release or convey their interest therein to the municipality, the tree warden shall acquire them for the use of the city or town by purchase, if it can be done at a fair price. Failing in this, he may take said trees for the use of the city or town by appraising the fair value of the same and by causing to be served upon the owner thereof a notice of such taking, which notice shall state the number of each variety of tree so taken, the location of the same as near as practicable, and the value thereof as fixed by him; and also by filing a copy of such notice as attested by him with the city or town clerk. If the owner shall be satisfied with the value stated in such notice, the tree warden shall cause the same to be paid to him forthwith. If the owner shall be dissatisfied with the action of said tree warden in valuing the trees so taken, he may, within thirty days after said notice has been served upon him, but not afterwards, apply to the selectmen to assess his damages. Such proceedings shall thereupon be had, including the right of appeal, as are provided in the case of assessment of damages in laying out highways by the selectmen; and thereupon such damages, if any, may be awarded as shall be legally and justly due to the landowner. Cities and towns are hereby authorized to raise and appropriate money to carry into effect the provisions of this act.

To make this law effective it is necessary to appoint tree wardens who will take an interest in their work. The cities and some of the larger towns have very active tree wardens, but in a great many towns no appointments have been made for several years, and those who served before are no longer acting.

The towns should appropriate money to enable the tree warden to carry out his specified duties of planting, protecting, and acquiring trees along the roadsides. It would also be expedient for towns to acquire trees along the way of new roads that are built. Since trees are valuable for protecting roads, it would seem advisable to give the State Highway Department authority to plant, acquire, and protect trees along state roads.

#### CO-OPERATIVE.

The most important coöperative work of the past two years has been the establishment and maintenance of a forest fire control service in the mountain region. This was accomplished with funds subscribed by timberland owners. A full account of it is given in Chapter I.

Other coöperative work has been carried on with small landowners in the central and southern parts of the state, but the time required to examine woodland and advise the owner on the ground has made it impossible, so far, to carry on much of this work. Numerous applications have been received for assistance of this kind, but on account of the more important work of appointing forest fire wardens and getting the fire protection system started the forester was able to visit and give personal attention to only 26 applicants.

The information desired was of the same general nature as that requested by correspondence, but more specific. Many wished to know when certain stands of timber should be cut, how the cutting should be done to insure natural seeding of desirable species, and what trees should be removed. Advice on the thinning of white pine stands and the planting of waste lands was also sought.

The general plan followed was to visit only those applicants located in towns which it was necessary to visit for the appointment of forest fire wardens. A brief examination of the land was then made by the forester, and the owner advised what forestry measures were practicable. If the

owner then desired to carry out the suggestions given, he either superintended the work himself or hired someone to do so. Most of the owners who were visited carried out the recommendations of the forester, and it is hoped that another year the work can be extended.

#### EXAMINATION OF THE STATE SANATORIUM LANDS.

A request was received from the trustees of the State Sanatorium at Glencliff for an examination and report on the timberlands belonging to the institution. The sanatorium uses about 800 cords of wood per year, and the trustees wished to know how much of this could be cut from the 320 acres of forest land without diminishing the supply, and what plan of cuttings should be followed.

A preliminary examination was made by the State Forester, but having no field force for such work, it was impossible to give the attention to this report which its importance required.

The services of a forestry student were secured and a rough map made showing the location of different kinds of timber. A brief report of the forest conditions was then prepared by the State Forester and recommendations made for cutting.

To give the information required a detailed map and working plan should be made showing the time and manner in which each block of timber should be cut, the amount to be removed and the growing capacity of the forest. It is a matter of regret that the Forestry Commission, on account of having no field force, could not serve the state better.

#### RECOMMENDATIONS.

As the practical value of forestry is being generally realized there are an increasing number of landowners who desire to benefit by the application of forestry principles to their woodlands. Such owners are constantly applying to the State Forester for advice and assistance. The recent law pro-

vides for this kind of work, but carrying into effect the provisions of the forest fire law leaves little time for the forester to devote to coöperative work, and will leave less time as the duties of the office increase.

Moreover, the increasing requests for information on forestry cannot be answered satisfactorily unless published in bulletins where each subject can be dealt with at length. To give full information to each person by letter is an impossible task. The nature of the requests indicate very clearly the subjects on which publications should be made. At present a bulletin on forest planting and one on the treatment of white pine stands would be especially useful.

It is therefore recommended that an assistant be employed who shall give part of his time to advising and assisting land-owners, a part being devoted to gathering useful information which can be published in bulletins and sent throughout the state. He could also assist the forester in carrying on exhibits at fairs, giving lectures, and in the care of a state nursery.

One important duty of the assistant would be to coöperate with towns in the management of forest land. Table IX shows a total of 8,182 acres of forest and waste land, owned by towns, including only those towns for which the information could be readily obtained. It is probable that other towns own tracts of considerable size.

Most of the land is in poor growing condition. Some of it has been burned and come up to a growth of valueless trees or bushes. The greater part of it has been cut over, the better trees being culled out, and is yielding the town no income. A small part of it is held for park purposes and improvement cuttings are needed from time to time. On all town lands, except those held for purely scenic purposes, the town should receive all the income that the land is capable of producing. The assistant forester could visit these town forests upon application from the selectmen and make plans for improvement cuttings, planting of waste land, and otherwise improving the value and future revenue of the

forest. It is recommended that the state furnish trees at cost from the state forest nursery for planting on town lands.

TABLE IX.  
FOREST LAND OWNED BY TOWNS.

NAME OF TOWN.	ACRES OF FOREST OR WILD LAND OWNED.
Laconia .....	7 *
Conway .....	6,000 *
Gilsun .....	76
Jaffrey.....	500
Keene .....	<del>212</del> 1,450
Richmond .....	100
Milan .....	100
Easton .....	100
Hanover and Dartmouth College.....	1,000
Littleton .....	40
Greenfield .....	15 *
Nashua .....	50
Newbury .....	250
Newington .....	<del>100</del> 200
Newport .....	9 *
Franklin .....	155
Exeter .....	16 *
Concord .....	<del>250</del> 400
Total .....	<del>8,182</del>

*manchester*

*1,800*

*6,571*



PLATE XI.—OLD PASTURE SLOWLY SEEDING TO PINE. THE TREES DO NOT STAND CLOSE TOGETHER  
AND ARE THEREFORE BUSHY.





PLATE XII.—PLANTED WHITE PINE FOREST, EAST WESTMORELAND, N. H. THIS PLANTATION WAS MADE ON A STEEP, ROCKY, WEST SLOPE THIRTY-FIVE YEARS AGO. THE LAND IS BETTER SUITED TO FOREST GROWTH THAN ANY OTHER USE.

## FOREST PLANTING.

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### EXTENT.

Forest planting in New England has passed the experimental stage. Enough plantations have been made in New Hampshire and in other states having a similar climate and soil to make reasonably certain the kinds of trees to use and the planting methods that will insure the commercial success of reforestation.

White pine is the tree which under average conditions is most suitable for reforesting cutover and waste land. Plantations of white pine were made in New Hampshire as early as 1868, but planted pine forests over forty years old are not numerous. Within the past ten years there has been an increasing interest in forest planting, and in 1906 the United States Forest Service reported that 865 acres in New Hampshire had been planted to white pine.

There are several chestnut plantations of small extent, but old enough to show the amount and quality of growth that may be expected, and red oak has been planted to some extent.

During the past two years the International Paper Company has planted about 80,000 Norway spruce seedlings. This tree grows more rapidly than our native spruce and is equally valuable for paper pulp. In the spring of 1910 about 165,000 white pines were planted in New Hampshire representing an area of about 135 acres. The total area of planted forest in the state is over 1,200 acres.

## IMPORTANCE TO THE STATE AND LANDOWNER.

In a state like New Hampshire, which contains great areas of mountain and hill land, a large percent of the land surface is better adapted to the growth of trees than to any other use. On some hills the soil is too poor to make farming profitable, while on many others the soil is rich, but the surface is too rocky or the slope too steep to permit their use for agriculture. Another type of land which cannot be farmed successfully includes the very sandy plains along the river valleys and near the coast. A great deal of abandoned farm land or cutover land is supporting a growth of valueless trees, or is remaining entirely unproductive. The importance of forest planting to the state lies in the bringing back of these waste lands to valuable timber growth. Its importance to the landowner lies in the fact that part of his land which is producing practically nothing is rendered productive and its value increases rapidly.

About one million acres of farm land in New Hampshire has been abandoned. Some of this land has come up to valuable stands of timber, but over most of it natural reforestation has been slow. Also the prolific seeding of such inferior trees as gray birch has given them an advantage over more valuable trees. An abundant crop of pine seed, which is produced about every seven years, has given rise to dense stands of second growth pine. In most cases, however, insufficient seeding has resulted in only a partial stocking of the ground. The scattered trees are bushy and often grow to maturity before the open places are filled with seedlings. In the central and southern part of the state the white pine has been the most valuable tree. It has come in on abandoned farm land in great abundance. In the northern part of the state spruce and fir have seeded in more abundantly.

Under average conditions the best tree to use in planting on abandoned land and pastures is the white pine. In the northern part of the state the Norway spruce may best serve

the purpose. If the soil is unusually poor it is better to use the Scotch pine or red pine. European larch is also a good grower, and among the hardwoods, chestnut or red oak are good trees to use. There are often found springy hillsides well suited to the growing of white ash and basswood.

#### PLANTS FURNISHED BY THE FORESTRY COMMISSION.

Section 2, chapter 124 of the Laws of 1903 provides that the Forestry Commission shall arrange with nurserymen to furnish seedling trees to landowners without cost to the state. Section 1 of this law provides for a rebate of taxes on planted land.

In the spring of 1910 an agreement was made for the furnishing of two-years-old white pine seedlings at the following prices, f. o. b., Suncook:

\$4.00 per thousand for lots of less than 25,000.

\$3.50 per thousand for lots of 25,000 or more.

\$3.00 per thousand for lots of 50,000 or more.

There were 50,000 seedlings sold in this way, and several thousand transplants were bought by the commission and sold within the state. There was a demand for a great many more than could be secured; 200,000 seedling and transplants could easily have been marketed.

As an evidence of the demand for forest nursery stock two commercial nurseries have been started in this state: the Keene Forestry Association, Keene, and J. S. Dearborn, Pembroke.

#### FOREST NURSERY STARTED BY THE COMMISSION.

Realizing the increasing demand for nursery stock, the Forestry Commission and the State Forester in the spring of 1910 leased a small piece of land in Pembroke for the purpose of raising white pine transplants. Thirty thousand two-years-old and thirty-six thousand one-year-old pine seedlings were purchased and transplanted on this land. Next spring

the older ones (three-years transplants) will be sold at cost in small lots, and in the following spring the younger ones will be sold. The principal object in starting this nursery was to enable the commission to furnish persons making a beginning in forest planting with a small amount of thrifty stock.

### RECOMMENDATIONS.

It is recommended that the state own and operate a forest nursery. The benefits secured would be many. The initial cost would be small and the annual cost of maintenance would decrease until the nursery would finally be self supporting.

In the first place a nursery of this kind would help to supply the increasing demand for planting stock, and experiments could be made as to the best means of raising thrifty trees. It would enable the raising of especially vigorous stock necessary for planting in unfavorable situations.

In the second place, it would enable the state to take up some system of coöperative planting with the towns and individual landowners. Most of the town lands have been cut or burned over and planting is necessary to bring them back quickly to a valuable growth of timber. A state nursery could furnish the kind of stock necessary for planting on these lands at cost and the values of the forests would be quickly built up.

In the third place, supplying the demand with native trees would obviate the necessity of owners importing foreign nursery stock which may be diseased.

## STATE FORESTS.

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### ACQUIRING STATE FORESTS BY GIFT.

Under section 4, chapter 44 of the Laws of 1893, re-enacted in 1909, which is quoted below, two tracts of land were acquired by the state in Cheshire county. One of these, the Monadnock reservation, comprises 600 acres on the south slope of Mt. Monadnock in Jaffrey, and contains a large amount of heavy spruce timber and young growth. The other, the Haven reservation, is also located in Jaffrey and comprises about sixty acres of mixed pine and hardwoods. An account of the acquisition of these lands by the state will be found in the New Hampshire Forestry Reports for 1905-06 and 1907-08 respectively.

The present law does not provide for the protection of this timberland against fire. Mr. Arthur E. Poole has been appointed custodian of both reservations, and, being interested in forest protection, has extinguished several small fires. His services have been rendered without compensation, there being no way by which such expenses could be met. It has been a constant source of anxiety to the commission and the forester lest some such contingency as a bad forest fire involving considerable expense should arise with no way of meeting it.

Furthermore, the present act does not provide for the practice of forestry on tracts acquired in this way. To get the greatest benefit from a state forest the state should be able to plant trees on the open places and improve the present stands of trees by judicious cuttings as the conditions warrant.

Several landowners have manifested a desire to give small tracts of forest land to the state, provided the land may be

used to demonstrate the principles of forestry. This, of course, involves planting, and the care, cutting, and sale of the timber crop.

In view of these conditions it is recommended that the present act be changed so as to permit the state to acquire land by gift for the purposes of forestry, and that provision be made for the protection of such tracts against fire, for mapping, planting, and otherwise improving the forest conditions, and for the cutting and sale of timber under the supervision of the Forestry Commission.

#### ACQUIRING STATE FORESTS BY PURCHASE.

A striking feature of the forestry movement in this country is the large amount of land that is passing into public ownership and management. The United States government has nearly two hundred millions acres in national forests under the control of the Forest Service, and many states are beginning to acquire forest land. The national forests of the West were part of the public domain, and their creation therefore did not involve purchase. For the establishment of the national forests in the East the land would have to be purchased, and it is due to this fact more than any other that the government has neglected to establish national forests in the mountains of the northeastern and southern states. With the increasing sentiment in favor of this purchase, it is probable that the government will own and operate forests in the East, but it is not likely to be done on a scale large enough to meet the increasing needs of better forest productivity. The tendency in the East is toward state forests, and New York and Pennsylvania have acquired immense areas. Maryland, New Jersey, Connecticut, and Vermont are also acquiring forest land.

The purchase and management of state forests in New Hampshire would be justified by four benefits which they would bring. First, they would serve to demonstrate the principles of forestry and permit experiments with different

methods of treatment so that the private owners could apply the successful methods. Second, forests on the high mountain slopes, which are of greater value for their effect on the soil erosion and stream flow than for timber production, and which private owners cannot afford to hold without cutting, could be held by the state and cut very conservatively. Third, a few small tracts of rare natural beauty could be preserved. Fourth, the state would derive revenue from the management of forests which serve the other three purposes.

#### DEMONSTRATION FORESTS.

Forests of this kind need not be large; a few hundred acres would serve as well as a large tract. Each forest should contain some waste land for planting and several kinds of timber typical of the surrounding territory. Several forests located in different parts of the state would thus enable many large and small owners to observe forestry work on land similar to their own.

The main purpose of the demonstration forest would be to stimulate an interest in private forestry. At first it need not be self-supporting, although it would naturally become so as the forest value was built up and cuttings made. Experiments could be carried on showing the different methods of cutting, and the open land could be planted with different kinds of trees planted pure and in mixture and different distances apart. Instruction could be given in the forest to those desiring it, and field meetings could be held so that those interested might visit the forest, observe the experiments, and discuss the application of different methods to their own timberland.

#### PROTECTIVE FORESTS.

On the high mountain slopes the soil is thin, the timber grows slowly and does not reach the size it does on the lower slopes. On account of the value of the forest cover and the spongy accumulation on the forest soil in holding back the



rainfall and preventing erosion, these slopes should be cut very carefully. Private owners cannot afford to cut these steep mountain slopes conservatively, and hence some have been entirely denuded. Such land is the least valuable of the timber-producing area, and the state could acquire it at a reasonable price and could legitimately manage it at a lower profit than the private owner will obtain in order to prevent complete denudation.

#### SCENIC FORESTS.

There are small tracts of natural beauty in different parts of the state, especially in the mountain region, that should be preserved for their scenic value. Since the hotel business has assumed such large proportions (and this in turn increases the railroad traffic) these tracts are of great commercial value to the state. The destruction of the surrounding forests would ruin them, and, being small in area, their acquisition would not involve great expense.

#### REVENUE FORESTS.

While being used for above purposes the state forest land would produce considerable revenue. It would probably not produce as much immediate return as if managed by private owners, but the state could afford the longer investment, especially as the conservative management of the forest would be serving other purposes.

#### RECOMMENDATIONS.

It is recommended:

1. That provision be made for the protection from fire of forest land now owned by the state, for planting, cutting, and otherwise improving forest conditions, in as far as compatible with the wishes of the donor.
2. That the commission be empowered to receive, in the name of the state, gifts of land for the purposes of forestry

and to survey and map the land and arrange for the transfer and registration of the necessary papers.

3. That small tracts of woodlands be purchased with the consent of the Governor and Council for use in demonstrating the principles of forestry, and that provision be made for the management of the same.

4. That all revenue derived from the sale of forest products from state lands shall revert to the state treasury.

## FINANCIAL STATEMENT.

### STATEMENT OF THE EXPENSES OF THE FORESTRY COMMISSION.

(From September 1, 1908, to August 31, 1910.)

The financial statement of the Forestry Commission for the two years covered by this report is made for three periods corresponding to the different means provided by the General Court for financing the work of the commission.

1. From September 1, 1908, until May 1, 1909, the only money received by the commission from the state was the secretary's salary of one thousand dollars per annum, and such sums as the Governor and Council audited for the expenses of the commission, as provided for in section 1, chapter 44, Laws of 1903.

Expenses from September 1, 1908, to May 1, 1909:	
Salary of secretary.....	\$863.88
Expenses of secretary .....	48.37
Printing blanks .....	102.37
Paper for reports.....	48.37
Printing and binding report.....	556.78
Total .....	<u>\$1,619.77</u>

2. The present forest law took effect May 1, 1909. To carry this law into effect until August 31, 1909, the end of the fiscal year, the General Court appropriated the sum of four thousand dollars.

Expenses from May 1 to August 31, 1909:	
Forest fire expenses (paid to towns)....	\$1,513.65
State Forester, salary .....	300.00

State Forester, field expenses.....	\$97.06
State Forester, transportation.....	10.00
Clerk .....	72.17
Expenses of commissioners.....	236.91
General office expense .....	177.61
Express, freight, and trucking.....	11.60
Printing .....	317.01
Technical equipment .....	496.22
Equipment for lookouts.....	539.27

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Total expenditure .....	\$3,771.50
Unexpended balance .....	228.50

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Total appropriation ..... \$4,000.00

3. For the year ending August 31, 1910, the sum of eight thousand dollars was appropriated.

Expenses for year ending August 31, 1910:

Forest fire expenses (paid to towns)....	\$3,569.77
State Forester, salary.....	1,800.00
State Forester, field expenses.....	465.64
State Forester, transportation.....	100.00
Clerk .....	560.00
Expenses of commissioners.....	80.29
Postage .....	271.52
Telephone service .....	121.23
Express, freight, and trucking.....	57.62
Printing .....	118.13
Office supplies and expenses.....	264.82
Technical equipment .....	80.82
Office furniture .....	359.10
Badges for forest fire wardens.....	145.00

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Total expenditure .....	\$7,993.94
Unexpended balance .....	6.06

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Total appropriation ..... \$8,000.00

ACKNOWLEDGMENT AND FINANCIAL STATEMENT OF MONEY  
RECEIVED FROM ROBERT E. FAULKNER.

The Forestry Commission and the State Forester wish to express their sincere appreciation of the generous contribution made toward the progress of forestry in the state by Robert E. Faulkner, former secretary of the commission. During his term as secretary, 1907 and 1908, Mr. Faulkner placed his salary at the disposal of the commission. This has made possible the accomplishment of work that otherwise could not have been done, and has decidedly advanced the cause of forestry in the state.

Up to October 1, 1908, \$1,750 were received, part of which was used by the commission in coöperation with the United States Forest Service in making an investigation and report on forest taxation, leaving a balance of \$759.15. Between October, 1908, and May, 1909, there were received \$613.88 and expended \$150, leaving \$463.88, or a total balance of \$1,223.03. This amount was placed with the State Forester by Robert P. Bass, treasurer of the fund, and an accounting is given below.

Amounts received from Robert P. Bass, treasurer of the Robert E. Faulkner fund:

October 19, 1909 .....	\$200.00
November 29, 1909 .....	100.00
April 15, 1910 .....	100.00
June 22, 1910 .....	100.00
October 11, 1910.....	723.03
	<hr/>
Total receipts .....	\$1,223.03
	<hr/> <hr/>

DISBURSEMENTS.

Equipping lookout station on Kearsarge mountain	\$255.99
Maintaining Kearsarge lookout to September 1, 1910 .....	126.00

Lantern and lantern slides.....	\$121.03
Incidental expenses .....	20.23
	<hr/>
	\$523.25
Balance on hand September 1, 1910.....	699.78
	<hr/>
	\$1,223.03

STATEMENT OF MONEY RECEIVED FROM NEW HAMPSHIRE  
TIMBERLAND OWNERS.

The following contributions were received from owners of timberland to be used for protection of the forests against fire. On September 1, 1910, the work of building and operating the lookout stations was still in progress and most of the expense has been incurred since that date. A description of the lookout service is given under "Mountain Lookout Service," page 65.

CONTRIBUTIONS.

Twitchell Brothers .....	\$200.00
Coe & Pingree Estate.....	500.00
A. M. Stahl .....	100.00
Champlain Realty Company .....	100.00
Berlin Mills Company .....	500.00
The Conway Company.....	300.00
M. F. Blanchard .....	300.00
International Paper Company.....	500.00
Pike Manufacturing Company.....	100.00
Odell Manufacturing Company.....	100.00
Publishers Paper Company.....	500.00
Connecticut Valley Lumber Company.....	500.00
The E. Libby & Sons Company.....	100.00
D. C. & C. G. Saunders.....	200.00
Dartmouth College .....	100.00
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	\$4,100.00

## SUMMARY OF RECOMMENDATIONS.

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### I. CONTROL OF FOREST FIRES.

We recommend:

1. *District Fire Organizations.* That the state be divided into four fire districts according to watersheds and a chief be appointed for each district, on salary, for certain months of the year, who shall, under the direction of the State Forester, have charge of all protective forestry work within said district.

2. *Lookout Stations.* That the state take over and own all mountain lookout stations which have been built and maintain the same hereafter; that this work be completed by the establishment and maintenance thereafter of additional stations; and that for this purpose the state acquire by gift, purchase or condemnation purchase observatory sites and rights of way for paths and telephone lines.

3. *Railroad Fires.* That coöperative measures be taken by the state and the railroads toward the diminution of fire damage from locomotives, and the railroads be invited by the Governor to participate with the Forestry Commission in an investigation of adequate means of protection.

4. *Lopping Branches on Softwood Cuttings.* That in all lumbering operations where softwoods are felled the branches shall be lopped from the felled tops so that the stem of the tree shall rest on the ground.

5. *Prevention.* That supply stations be established at advantageous points throughout the states containing tools used in fire fighting and provisions necessary to men employed; that proper maps be made and placed in the hands of the town and district forest fire wardens; that fire lines and fire

trails be built; that paid patrols be employed at suitable points and necessary times, and that a separate appropriation be made for these purposes to be used at the discretion of the commission for purposes of prevention to supplement the appropriation now made for the extinguishment only of fires already started. These provisions are particularly necessary for the protection of the present state land.

6. *Burning Brush.* That as a means of preventing the large number of fires caused by brush burning and supplementary to section 13, page 43, no person be allowed to burn brush between April first and November first without the permission of the forest fire warden.

7. *Forest Fire Warden Conferences.* That annual conferences of the town forest fire wardens be called by the State Forester in different parts of the state to improve the service, and that wardens be reimbursed for their traveling expenses to such conferences.

8. *Deputy Forest Fire Wardens.* That power be given to the State Forester to appoint deputy forest fire wardens in organized towns as well as in unincorporated places, and sufficient appropriation be made to enable the carrying out of section 4 of the present law, which provides for patrol in times of drought.

9. *Spark Arresters on Portable Steam Sawmills.* That the amendment providing for the use of spark arresters on portable steam sawmills be reenacted as a separate act. It is at present an amendment to Chapter 95, Laws of 1905, which has been repealed.

## II. EDUCATIONAL AND CO-OPERATIVE WORK.

We recommend:

1. That an assistant be employed to help the State Forester in carrying out the following work:

- (a) Doing field work necessary in coöperation called for by law with towns and timberland owners in planting and management of forests.



- (b) Attending exhibits at fairs, etc.
- (c) Gathering data for bulletins.
- (d) Making fire maps.
- (e) Raising and distributing trees from the state nursery.
- (f) Care and improvement of forest land owned by the state.

2. That forestry bulletins be issued from time to time to answer frequent applications for information and for scientific purposes.

### III. FOREST PLANTING.

We recommend:

1. The establishment of a state forest nursery for the growing of forest seedlings to be distributed within the state; for coöperative, scientific and experimental purposes and to obviate the necessity of importing foreign seedlings which may be diseased.

2. The acquisition of a suitable plat of land near Concord for a state nursery.

### IV. STATE FORESTS.

We recommend:

1. That provision be made for the protection from fire of forest land now owned by the state, for planting, cutting, and otherwise improving forest conditions, in as far as compatible with the wishes of the donor.

2. That the commission be empowered to receive, in the name of the state, gifts of land for the purpose of forestry and to survey and map the land and arrange for the transfer and registration of the necessary papers.

3. That small tracts of woodland be purchased with the consent of the Governor and Council for use in demonstrating the principles of forestry, and that provision be made for the management of the same.

4. That all revenue derived from the sale of forest products from such lands shall revert to the state treasury.

## V. FOREST TAXATION.

We recommend:

The repeal of the present tax abatement law, which is inadequate and producing no results.

The carrying out of the suggestions contained in the conclusions arrived at in the tax investigation made by the United States Forest Service and published in the New Hampshire Forestry Report for 1907-08.

## VI. SHADE TREES.

We recommend:

That the towns appropriate under chapter 98, section 4, Laws of 1903, a sum for the protection of all shade trees growing on the public rights of way not owned by the state and appoint tree wardens and exercise their rights over such trees as given by the sections 2, 3, and 5, chapter 98, Laws of 1903.

That the care of trees along the state highways be placed in the hands of the State Highway Department.