PROGRESS OF FORESTRY IN 1907.

By

Q. R. CRAFT,
Forest Service,

AND DIRECTORY OF FOREST OFFICERS, ASSOCIATIONS, AND SCHOOLS.

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ADVANCE OF AMERICAN FORESTRY IN A DECADE.

In the last ten years forestry has advanced in this country from an almost unknown science to a useful, growing profession. In that time the number of technically trained foresters has increased from less than a dozen to over 400. Ten years ago there was not a single forest school in the country; now there are several professional forest schools which rank with those of Europe, and a score more with courses in elementary forestry whose usefulness is steadily growing. Forest lands under management have grown from one or two tracts to many, aggregating 7,503,000 acres, scattered through 39 States. The National Forests have increased from 39,000,000 acres, practically unused and unprotected, to 165,000,000 acres, used, guarded, and improved both in productiveness and accessibility. The number of States which have State forests has increased from 1 to 10; and of those which employ trained foresters from none to 11. The membership of forest associations has increased from 3,600 to 15,800. Ten years ago, except for a few of the foremost botanists, European foresters knew more about American forests than did the people of this country. In Europe they were then using preservatives to prolong the service of beech ties, and so adding from twenty to forty years to their life. Here, on the other hand, scarcely a treated tie had been laid, whereas there are now 60 treating plants, 27 of which treat ties exclusively, and an engineer who recently returned from Europe reports that both in size and mechanical perfection the treating equipment of this country is ahead of any to be found abroad.

And yet American forestry has only safely passed the experimental stage and got ready to do something. Action, immediate and vigorous, must be taken if the inevitable famine of wood supplies is to be lessened. We are now using as much wood in a single year as grows in three, with only twenty years' supply of virgin growth in sight. Only the application of forest knowledge with wisdom, method, and energy, in the next ten years, can prevent the starving of National industries for lack of wood.

TIMBER A PROFITABLE CROP.

The growing of timber as a farm crop has gained a permanent place in American agriculture. Each time a thrifty farmer sees a neighbor cutting a supply of fence posts and obtaining, out of the same stock, enough firewood to pay for the work, or selling on the stump a quantity of saw timber, the product of a farsighted investment of fifteen, twenty, or twenty-five years ago (Pl. LXIV), he realizes more keenly the importance of the wood crop. A farm without a good woodlot is incomplete.

Where the rainfall is heavy, the woodlot can be maintained on land not the best for other purposes, while, in a region where good land must be selected, it is the opinion of experienced men that the trees pay for the ground they occupy, in protection to the farmstead, the orchard, or adjoining fields. With the shelter of a windbreak, less feed is required to winter stock, danger to an orchard from late frosts is reduced, and the comfort of the home, as well as its beauty, is greatly increased. Indeed, some owners have estimated the value of good groves at $1,000 an acre, on the ground that the value of their property is increased to that extent by the trees. Where the forest has been given attention, the returns have yielded a net profit of $4,

$6, $8, and $10 per acre. The choice of species, methods of planting and care, suitability of the soil, and local market conditions may vary so widely that it is difficult to generalize for the country as a whole. However, in every State a share of the farm can be devoted to growing timber with a profit in some cases nearly or quite equal to that obtained from agricultural crops. In addition, protection, the convenience of having farm repair materials at hand, and increase of farm values are secured.

That forest planting is increasing is evident from the increased demand for planting material. One nurseryman last spring shipped 400,000 jack pine seedlings to Nebraska alone. One order, for 10,000, was for planting in the vicinity of the Brunner plantation, in Holt County, an example of successful forest planting which has been of high educational value. The Government nursery at Halsey has also been most helpful in determining the adaptability of conifers for planting on sandy soils in Nebraska and adjacent States.

Plans have been made for a Florida tract, which involve the most extensive replanting ever begun in the South. The lands, situated in Marion and Citrus counties, include 3,000 acres of sandy brush and grass-covered land, which it will be necessary to restock by artificial means. Longleaf pine seed will be sown in spots as a means of accomplishing this.

In New England, New York, and Pennsylvania great interest has been taken in planting white pine and other species, while eucalyptus planting has been given much attention in California. The interior of one of the largest buildings in Los Angeles was finished in eucalyptus imported from Australia at $250 a thousand board feet. This tree grows very rapidly, and is especially adapted to California. Four companies have been formed, which will plant in the aggregate several thousand acres with eucalyptus. It is with this tree that the Santa Fe Railway is planting 8,650 acres near San Diego, to test its suitability for the production of ties.

The woodlot offers an excellent opportunity for the practice of forestry. It is accessible enough to allow of moderate cuttings at frequent intervals, and it may be protected from trespass and grazing, and from fire, its chief enemy, without an elaborate scheme of defense; then, taxation is not a great burden, because the revenue from farm supplies more than meets this item every year and thus prevents the accumulation of interest.

The application of intensive forestry to large tracts will naturally be of limited extent for some time to come. Closer utilization, provision for a second crop by the setting of a minimum diameter below which trees shall not be cut, and protection from fire are conservative measures which are steadily gaining ground. But looking into the future far enough to make provision for a third crop is not yet common, while efforts to bring forest lands to high productive capacity have as yet scarcely been attempted. In wealth of soil and high commercial value of native trees America has a decided advantage over Europe, where intensive forestry is paying well. American corporations and long-time investors, as well as the provident farmer, must go deeper into forestry to reap full reward.

An increased appreciation of the value of young forest is shown by the fact that in northeast Connecticut corporations are buying lands well stocked with trees 10 or 15 years old at prices which make it profitable to buy cut-over lands and restock them.

Experiments to learn what woods can be used to supplement the use of spruce for paper have shown conclusively that pulp of commercial value can be manufactured by the sulphite process from the hemlock of the Northeast and Lake States, Michigan tamarack, the loblolly and scrub pine of the South Atlantic and Gulf States, the cypress and tupelo gum of the southern swamps, the lodgepole pine and Engelmann spruce of the Rocky Mountain region, and the white fir and western hemlock of the Pacific coast. The experiments indicate that much of the pulp can be bleached and used for high-grade paper. White fir is especially suitable for the manufacture of papers where a long fiber and a good color of unbleached stock are desired.

California tanbark oak, hitherto considered of principal value for the tannin in its bark, has been found through timber tests to be suitable for cooperage and wagon manufacture. In strength it compares favorably with eastern oaks and hickory.

Recent tests on structural timbers—loblolly, longleaf, and Norway pines, and tamarack, for the eastern United States, and Douglas fir and western hemlock for the western—have shown longleaf pine to be the strongest and stiffest of the timbers mentioned, with Douglas fir a close second, while western hemlock, loblolly pine, tamarack, and Norway pine follow in the order given. Fortunately, Douglas fir and western hemlock, of which there are comparatively large supplies, have high structural merit, as has also loblolly pine, the principal tree in the operations of the southern lumber companies, which are beginning to look upon their forest holdings as part of their capital from which successive crops should be secured.

GROWING TIMBER AS A FARM CROP.

Trees for cutting every year. Combined shelterbelt and woodlot planted by John Tetlow, Downs, Kans., who for several years has secured from it his fuel and the posts necessary for the fences of a 320-acre farm: 1. Black locust, 3 years old from seed, for planting. 2. Trees 6 years old. 3. Future fuel supply; cottonwood 8 years old, 7 inches in diameter and 50 feet high. 4. Black locust 17 years old, diameter 11 inches, height 36 feet. 5. Black locust 33 years old, average height 33 feet, diameter, 5.7 inches; by good care at the first the trees are started to growing vigorously, and are cut for fence posts and fuel ahead of the borers; an earlier crop of fuel was secured from cottonwood planted in mixture. 6. Sprouts 3, 5, and 6 years old from trees [illegible] merchantable size.

BETTER UTILIZATION OF YELLOW PINE.

At present not more than 50 per cent of the southern pine comes to the market in material of value. For many years effort has been made, with gradually increasing success, to utilize by distillation methods the defective logs and high stumps, which are rich in turpentine, and the slabs, edgings, and sawdust. The variety of methods employed, which are often faulty, and the lack of uniformity in the product, together with an objectionable odor, have caused wood turpentine to be considered an adulterated material, or, at least, a poor substitute for gum spirits. Through conferences and experiments, however, these difficulties are being overcome. Steam distilled turpentine is found to be superior to that from the destructive distillation process. It is estimated that 30,000,000 gallons of turpentine, worth $14,000,000, can be produced from the waste wood of one year.

PRESERVATIVE TREATMENT OF RAILROAD TIMBERS.

The increase in the number and size of railroad treating plants during the year has been phenomenal. The scarcity of suitable timbers for railroad ties, combined with the high prices which they consequently command, is one of the reasons for the remarkable increase in the number of railroads which are beginning to treat and use the inferior timbers found along their own lines.

Increase in number of railroad treating plants.

1902	1903	1904	1905	1906	1907
7	10	13	15	15	27

Reports of the American Railway Engineering and Maintenance of Way Association show that the railroads which have been pioneers in treating timber have found it a paying investment. The Chicago and Northwestern Railway erected a tie plant in 1903, and since then has been treating hemlock and tamarack at the rate of about 600,000 ties a year, and now treats also beech, birch, and maple. The Santa Fe Railway has laid 13½ million treated ties, and the records show the average life of those first laid to have been 10.62 years. When, in 1904, a considerable amount of main-line track in New Mexico was washed out and replaced temporarily with untreated ties, treated ties were substituted as soon as they could be obtained, and the untreated ties were sent to the plant for treatment. According to the latest report, a total of 12,000,000 ties annually, or 12 per cent of the total cut, are now treated.

INCREASED EDUCATIONAL FACILITIES.

The progress of the year in forest education has been not so much in the establishment of new professional schools as in the strengthening of existing courses and the addition of new ones in established schools. The older schools, such as Yale, Biltmore, Michigan, and Harvard, have made steady growth. In fact, no previous year has witnessed such great success in outlining thorough theoretical and practical courses, and in securing the ablest men to conduct them. This development in the educational field has given new departments of forestry to institutions which formerly had only courses on forest subjects, and added new men specially prepared to give instruction in particular subjects. As a result, the student's opportunities to secure technical forest training are better than ever before. Although a trip through the well-managed European forests and, even better, supplementary schooling abroad are of decided advantage, it is nevertheless true that for practical forest work under American conditions the forest student no longer need go abroad for his training. Like Yale, the schools of the universities of Michigan and Minnesota, as well as Colorado College, now have summer schools. During the year courses in forestry have been established at the University of Washington, the Washington State Agricultural College, Pennsylvania State College, and the Winona Agricultural Institute, Lake Winona, Ind., and a series of lectures has been begun at the Agricultural College of Utah. Practical work at the Michigan Agricultural College has been promoted by a grant of 40,000 acres of woodland by the State for forest demonstration, at Harvard by the gift, for a similar purpose, of a 2,000-acre tract of forest land at Petersham, Mass., and at the Pennsylvania State College by the conversion of several acres of the college domain into a demonstration farm woodlot. A six-weeks course in forestry has been added to the curriculum of the Connecticut Agricultural College at Storrs. The number of graduates from American forest schools, by years, is as follows:

1899	1900	1901	1902	1903	1904	1905	1906	1907
3	3	7	24	33	42	50	56	66

ADVANCE IN NATIONAL FOREST MANAGEMENT.

The National Forests, of which there are now (April 1, 1908) 164,963,555 acres, are constantly being used in more ways and by more people. Added experience is making possible the classification of the forests by types, with general instructions concerning the systems of cutting best calculated to secure in each type the production of the most wood of the best quality. In carrying out some of the timber sale contracts utilization is now almost as complete as in a German forest. The lumbermen who are cutting timber under regulation on the National Forests are competing in the market with those who cut outside—a direct argument that conservative forestry is thoroughly practicable from the lumberman's point of view.

The third year of systematic fire control recorded an improvement of 40 per cent over 1906 and 65 per cent over 1905.

Reduction of loss by fire on the National Forests.

	1905.	1906.	1907.
Area of National Forests.....acres..	97,711,455	127,167,271	162,023,190
Area of forest burned over.....do....	279,592	115,416	109,410
Amount of timber burned .....thousand board feet..	152,557	101,970	31,026
Value of timber burned.....	$101,282	$76,183	$31,590

Marked progress has also been made in securing prompt communication between the comparatively few men charged with the custody of wide areas. At present 1,185 men must guard 160,000,000 acres, an average of 135,000 acres, or 211 square miles, for each man. Ranger's cabins have been erected, and roads, trails, telephone lines, and bridges have been constructed.

The roads and telephone lines greatly assist in controlling fires, especially with the aid of lookout stations, which are established at strategic points. A typical example will illustrate how important are these improvements as means of overcoming distance in the administration of the forests. In the Southern Division of the Cabinet Forest there are two lookout stations, from which, with the aid of field glasses, nearly a million acres are visible. The system of patrol provides that once or twice each day, and constantly during the danger seasons, rangers shall scrutinize the forest from these lookouts. Notice of a fire can be sent by telephone, and the roads, trails, and bridges make it possible to obtain help promptly.

Construction of permanent improvements on the National Forests in 1907.

State or Territory.	Area of forests on which improvements were made in 1907.	Trails.	Roads.	Bridges.	Telephone line.	Fence.	Cabins.	Barns.
	Acres.	*Miles.*	*Miles.*	*Number.*	*Miles.*	*Miles.*	*Number.*	*Number.*
Arizona	11,470,870	91	1	1	107	24	29	8
California	23,082,994	485	.....	46	733	33.5	60	12
Colorado	15,748,772	166	14	16	470	104.5	63	6
Idaho	20,336,487	454	30	50	291	24	55	11
Montana	20,402,676	283	15	21	569	42.5	85	21
Nebraska	556,072	.....	.....	.....	95	1	2	1
Nevada	2,528,479	.....	1	.....	.....	2	4	2
New Mexico	8,303,979	182	8	14	67	64.5	42	4
Oklahoma	60,800	.....	.....	.....	15	1	.....	1
Oregon	16,463,535	613	44	25	373	107	27	8
South Dakota	1,263,720	.....	.....	.....	13	5	9	4
Utah	7,415,832	106	3.5	6	116	23	34	4
Washington	12,065,500	333	7	17	135	17	22	2
Wyoming	8,998,723	24	12	3	216	19	19	2
Total	141,698,379	2,737	135.5	199	3,200	368	451	86

The regulation of the range by the Government has proved a decided success. No longer hustled from one place to another in competition for insufficient feed, stock is now brought through to the end of the summer in better flesh and with fewer losses than formerly. During 1907 improvement of the range by protection was supplemented by experimental investigations to determine how the amount of forage can be increased; how plants of little value can be replaced by others more useful; how poisonous plants

can be got rid of or their effect upon stock counteracted by treatment; and to plan a system of handling stock that will result in the most economic utilization of the forage crop.

Experiments in seeding portions of the range with cultivated grasses were begun, and careful detailed study was made of typical range areas to learn under what conditions the best native grasses propagate most successfully. An experimental pasture was constructed where the action of sheep under various systems of handling could be investigated and the effect of each system upon the forage crop ascertained.

FORESTRY IN THE STATES.

The year 1907 was characterized by larger opportunity than ever before for the practice of forestry under State organization. Delaware, Kentucky, Missouri, and Mississippi are better acquainted with their forest resources, by reason of forest surveys conducted in cooperation with the Forest Service. Taxation, now the most difficult problem in State forest work, is receiving thoughtful attention. At the unusually large and enthusiastic annual meeting of the Michigan Forestry Association, held at Saginaw in November, foresters from the Lake States and from Canada conferred on this and other questions, and in January a similar conference was held in New York. A study on the ground, to learn how present tax laws affect the profitableness of forest investments and how they are regarded by the people, has been inaugurated in New Hampshire by that State and the Forest Service in cooperation. If each of the States with a forest organization could contribute the figures of the stumpage for the State the work of securing a timber census of the whole country would be greatly simplified.

Some results of State forest work.

State.	Fire patrol.			Nurseries.	
	No. of wardens.	Annual expenditure.	Damage from fires in 1907.	Location.	Trees grown.
California	572	$5,500	$420,000		
Connecticut	400	464		Union tract, Tolland County.	White pine.
Hawaii	51			Nuuanu Station, Tantalus Forest.	Ironwood, blue gum (eucalyptus), black wattle, silk oak.
Indiana				Henrysville	Black locust, catalpa.
Kansas				Ogallah, Dodge City	Honey locust, Osage orange, catalpa, ash, elm.
Maine	250	2,000	5,830		
Massachusetts	320			Amherst	White pine, white ash.
Maryland	53	100	50,000		
Michigan				Roscommon	White, red, and western yellow pine, Norway and red spruce.
Minnesota	1,700	1,500	30,000	Pillsbury tract, Itasca State Park.	Norway spruce, white pine.
Mississippi				Agricultural College	Black locust, hickory, osage orange, catalpa, southern pines.
New Jersey	272	[a]3,513	11,647	Bass River tract	White pine.
New York	[b]746	7,500	9,610	Saranac Inn Station, State Fish Hatchery, Wawbeek, Axton.	White, Scotch, and red pine (nearly all promising species in small quantities).
Ohio				Wooster, Lancaster, Carpenter.	Catalpa, ash, yellow poplar, white pine, black locust, Norway spruce.
Pennsylvania	60	[c]	[d]	Greenwood, Huntingdon County; Asaph, Tioga County; Mont Alto, Franklin County.	White and Scotch pine, European larch, Norway spruce, balsam fir, hardwoods.
Rhode Island			15,000[e]		
Vermont	[e]240		2,225	Burlington	White pine.
Washington	100	[f]9,424	54,600		
Wisconsin	308	1,500	[d]		

[a] $2,813 by the State; $700 by township.
[b] Town fire wardens, 133; district fire wardens, 613.
[c] Expenditure for patrol not segregated; appropriation for administration, $125,000; for land purchase, $250,000.
[d] Not yet compiled; in 1906, for Pennsylvania, $70,070.
[e] First selectman of each town.
[f] The expenditure in 1906 was $11,500, and the damage reported, $294,430.

Some results of State forest work—Continued.

State.	Number of trees in nursery.	Planting.			Area of State forests.
		Trees distributed in 1907.	Trees planted in State forests.	Total number of trees planted under direction of forester.	
					Acres.
California					3,800
Connecticut	1,000,000	300,000	50,000	400,000	1,400
Hawaii	30,000	20,100			397,687
Indiana	300,000		800,000		2,000
Kansas	179,500	[a] 83,964			
Maine					
Massachusetts	300,000	57,400			
Maryland					1,957
Michigan	2,000,000	65,000	150,000	650,000	39,000
Minnesota		[b]			42,800
Mississippi	50,000			26,000	
New Jersey	25,000		30,000	75,000	9,867
New York	[c] 1,674,750		450,000	2,633,100	1,548,450
Ohio	512,000	138,046		138,046	
Pennsylvania	2,388,800		[d]	215,000	761,000
Rhode Island				10,000	
Vermont	350,000	30,000			
Washington					
Wisconsin					300,000

[a] Distributed by station at Ogallah: The per cent living at the close of the year were honey locust, 68; osage, 66; catalpa, 73; ash, 68; elm, 80.

[b] Minnesota expends $20,000 annually in bounties for tree planting on prairie land.

[c] Four-year transplants, 470,350; 3-year-olds, 239,100; 2-year-olds, 65,300; 2-year-old seedlings, 640,000; 1-year-old seedlings, 860,000.

[d] Total number not at hand; number planted in 1907, 50,000.

During the year the State of Alabama created a forest commission, which has been organized and has begun work. The provisions of a new and excellent forest law are briefly stated under "Forest legislation" (p. 14). Of especial importance is the clause which provides for exemption from taxation for ten years of small areas which bear a young and growing stand of timber, provided the land is protected from forest fires. Bulletin 1, "Forestry and Forest Preservation in Alabama," has already been issued by the commission.

Prominent among the projects carried forward by the State forester of California was the publication of a comprehensive bulletin on the commercial production of eucalyptus. Preservative treatments of cedar, pine, and fir ties and poles, conducted in cooperation with the Forest Service at Los Angeles, showed that a 40-foot pole, worth $7.50, can be preserved with creosote at a cost of $2 so as to secure additional service worth several times the additional cost. The State fire patrol was materially strengthened.

In Connecticut 50,000 trees were planted in the Union forest, and fire lines were constructed. In the Portland forest 8,000 trees were planted and thinning was made. The State nursery has been increased to a capacity of a million trees, part of which will be ready for distribution at cost price to landowners this spring, and part two years later. In 1906 about 100,000 seedlings were furnished private owners, and in 1907 three and one-half times as many. Perhaps 1 per cent of the area of the State is owned by private parties or corporations now practicing at least crude methods of forestry. A forest survey of the State has been started. The forest-fire warden system has been developed and proved efficient in preventing fires. During the first year of the service, reports were received from 66 towns. In 35 of these 88 fires were reported, of which 64 were extinguished by the wardens and their assistants, at a total expense of $464.56, or an average of $7.25 per fire. The expense to the State was $116, to the counties $116, and to the 22 towns in which the fires occurred $232.28, or an average of $10.55 per town. Forty-five of these fires occurred in April and 25 in May, while the rest were scattered through the year.

Georgia's interest in forestry is manifest in the advancement of the course in forestry in the State University to a department, and in systematic educational work by the newly formed State forest association, which issues a publication, "Southern Woodlands." The result of a study of Georgia's forest resources, with maps, has been published.

Hawaii, early to take up forestry, conducts systematic practical work along two main lines—the maintenance of protection forests on important watersheds and the planting of waste and barren areas with useful trees. Lectures are given by the superintendent of forestry before the students of the College of Agriculture. An examination was made during 1907 of the forest back of Hilo, Hawaii, which it was found necessary to preserve as a protection to a watershed. It has been demonstrated that rubber grows well in Hawaii, and a large area will be planted with rubber trees, which afford a good forest protection to the land. A Hawaiian corporation has agreed to furnish an American railroad with 500,000 ohia cross-ties yearly for the next five years.

The State University of Illinois, at Urbana, has an interesting experimental plantation, and the State Normal School at De Kalb has established one more recently.

Among the varied activities of the Indiana forestry commission, none is more productive of better results than the encouragement of planting, by experiments conducted on the State reserve and by published information on forestry in general and on the success of those who are growing timber in Indiana.

In Iowa the professor of forestry at the State College carries on experiments and State work. Among the problems now under consideration are the improvement of planted groves and natural woodlots, the determination of what are the most valuable species for general woodlot planting, the best methods of planting and handling the woodlot, and the development of simple methods of preservative treatment which can be carried out economically by the farmer.

Since the establishment of the Fort Hays experiment station, in west central Kansas, a series of experiments has been started, in the very center of the Plains region, in growing young trees according to various cultural methods on upland and bottomland on a scale large enough to lend authoritativeness to the results. The State forestry stations at Ogallah and Dodge City are directing their chief efforts to the distribution of young trees in the westernmost counties.

Through cooperation between the State of Kentucky and the Forest Service, a study was made of the present timber supply of the eastern part of Kentucky, the rate of consumption, and other facts which would be of value in formulating a State forest policy.

Under the Louisiana forest law police jurors of the parishes (similar to county commissioners in other States) are also fire wardens. A campaign of education is being conducted to emphasize the necessity of preserving the forests. The absence of disastrous fires in 1907 is encouraging.

In Maine another year of comparatively light damage from forest fires gives additional testimony to the value of patrol. In the establishing and maintaining of lookout stations Maine has taken an advanced step, and present experience indicates that for successful control of fires the money can not be expended in a better way. Increased registration of forest students at the State University—a total of 45 students—is evidence that forestry is to have a much wider application in woodlot and timberland management. The junior class will plant 10,000 white pine seedlings this spring. Practical work is also gained in making thinnings in the university woodlot of 100 acres.

A State forest survey, conducted by the State forester in conjunction with the examination of timber tracts for private owners throughout the State, has awakened new interest in forest preservation in Maryland, and inquiries are met by the publication of circulars which deal with practical State problems. Arrangement has been made for a series of experiments in the preservative treatment of fence posts, to be carried on by the Maryland State experiment station in cooperation with the Forest Service. Fence posts of the kinds of wood which grow in commercial quantities in Maryland will be treated by different methods and set on the station grounds, where they will be subject to frequent inspection.

The State forester of Massachusetts issued, besides the annual report, the following publications: The Commonwealth of Massachusetts Forest Laws; Brief Instructions to Massachusetts Forest Wardens; How and When to Collect White Pine Seed; Forestry from the Commercial Standpoint; The Commercial Forest Trees in Massachusetts; The Study of Trees in Our Primary Schools; and Forest Laws Concerning Railroads. Forest-fire notices were printed and posted. An offer was made by the State forester to supply, for $1, express paid, 150 white pine and 150 white ash 2-year-old trees (Pl. LXV, fig. 1) for one-fourth acre planting in Massachusetts. The demand was so great that only half-orders could be filled. Schools were offered the following for $1: Twelve white pine seedlings, 2 years old; 24 white ash seedlings, 2 years old; 12 red spruce seedlings, 2 years old; 5 beech seedlings; one-half ounce of white pine seed; 12 chestnuts; 25 acorns; and 50 white ash seed. Sample plats have been established in all but four of the counties of the State, to study the yield and rate of growth of white pine. A State forest map has been prepared and an estimate made of the total forest areas, classified by types in each town and county. A study was made of the white pine blight.

In Michigan, during the fiscal year 1906–7, dead timber to the value of over $3,000 was sold from the State forest reserve. Over 60 miles of fire lines have been built. Owing to the efficiency of the fire patrol, no fires occurred this year. The plantations of the Saginaw forest farm, at Ann Arbor, are becoming a valuable object lesson, not only for school and experimental purposes, but for the general public. The Cleveland Cliffs Iron Company has increased its staff of foresters and is planning reforestation on a large scale. On the Ausable River, on Manitou Island, and at Cedar Lake landowners are carrying on extensive reforestation. Two investors at Grayling are purchasing lands and making preparations to convert these into regularly managed forest properties. The forestry commission distributed over 60,000 seedlings for experimental plantations among various landowners in the State. Forest sentiment among the people, among legislators, and with the press is steadily growing. One of the best illustrations was the enthusiastic meeting of the Northern Michigan Press Association at Traverse City, where an entire evening was devoted to forestry, and reforestation was strongly advocated.

The forest law of Minnesota of 1895 made town supervisors fire wardens under direction of a chief fire warden, who, among other duties, was required to make an annual report, including "important facts relating to forest interests." The annual appropriation to execute the law is $11,000. The legislature of 1907 placed Itasca State Park, at the headwaters of the Mississippi, under charge of the forestry board, appropriated $2,000 a year for demonstration work there and $1,500 for fire breaks, development, and improvements. It also appropriated $2,500 for planting on the Pillsbury Reserve the 3-year-old Norway spruce seedlings which the board had raised on that reserve. An area of 185 acres was thus planted at an expense of $6.50 per acre. In 1906 the board imported 20,000 white pine seedlings from Germany, which were planted the same spring on the Pillsbury Reserve.

During the fall of 1907 the Forest Service cooperated with the geological survey of Mississippi in an examination of cut-over longleaf pine lands. These lands are, with few exceptions, in wretched condition, because of recurring fires. Since they will not be needed for agriculture for many years, they should in the meantime be reproducing pine, to prolong an industry that means much to the State. In 1906 Mississippi ranked third in yellow pine production, cutting more than 1,500,000,000 board feet, or 13 per cent of the yellow pine cut. This business, with its attendant market for farm and other products, will soon be lost without fire prevention.

As a result of cooperative forest studies in the Ozark region of southern Missouri and western Arkansas, between the State of Missouri and lumber companies on the one hand and the Forest Service on the other, one large lumber company which controls in the aggregate four billion feet of standing timber has begun the application of forest management to its holdings.

Nebraska has begun to reap the fruits of early forest work, and the past year has manifested that many of the apparent failures of former years were in reality important lessons in the selection of proper species and methods of planting under peculiar conditions. The number of students in the different courses of forestry in the University of Nebraska shows a healthy growth. In addition to the regular courses a special course is given for public school teachers, and during the year a course for advanced students and courses of lectures on silvics and State forest policy have been inaugurated. The permanent equipment of the department of forestry has been enlarged, and now includes, among other additions, a forest herbarium, a large collection of wood specimens, and a portable sawmill for practical demonstrations upon the timber grown by provident farmers of that vicinity.

The forest survey of New Hampshire has not only made available information about the forests, but has greatly stimulated the practice of forestry. Dartmouth College now has a tract of 26,000 acres in the northern part of the State under forest management, and about 1,000,000 board feet a year are cut with care for reproduction. The water boards of Concord, Nashua, and Hanover are applying forest methods to tracts of 350, 700, and 1,000 acres, respectively. Sixty plantations of white pine have been made, one of them, at Manchester, comprising 25 acres. As an experiment, 240 acres at Winchester have been sowed by the broadcast and the spot methods.

During the past year New Jersey has developed a definite policy. The forest commission is actively working for the betterment of the woodlands of the State, to establish values in forest lands, and to make them continuously productive. The means employed are control of forest fires and instruction of woodlot owners. The State contains numerous forest areas of considerable size, but for the most part the work concerns itself with the intensive management of woodlots for the production of ties and lumber for nearby markets. During the one year of its operation the fire service has succeeded in reducing the acreage burned and the damage done to woodlands to less than one-tenth that of any former year. This has already affected

favorably the market price of forest property. The commission has acquired about 11,000 acres of land for State reserves, and will develop the property as demonstration areas and public parks. It recognizes, however, that the private owner has, and will continue to have, the greatest interest in this question, and will, therefore, devote every effort to make such lands valuable and productive.

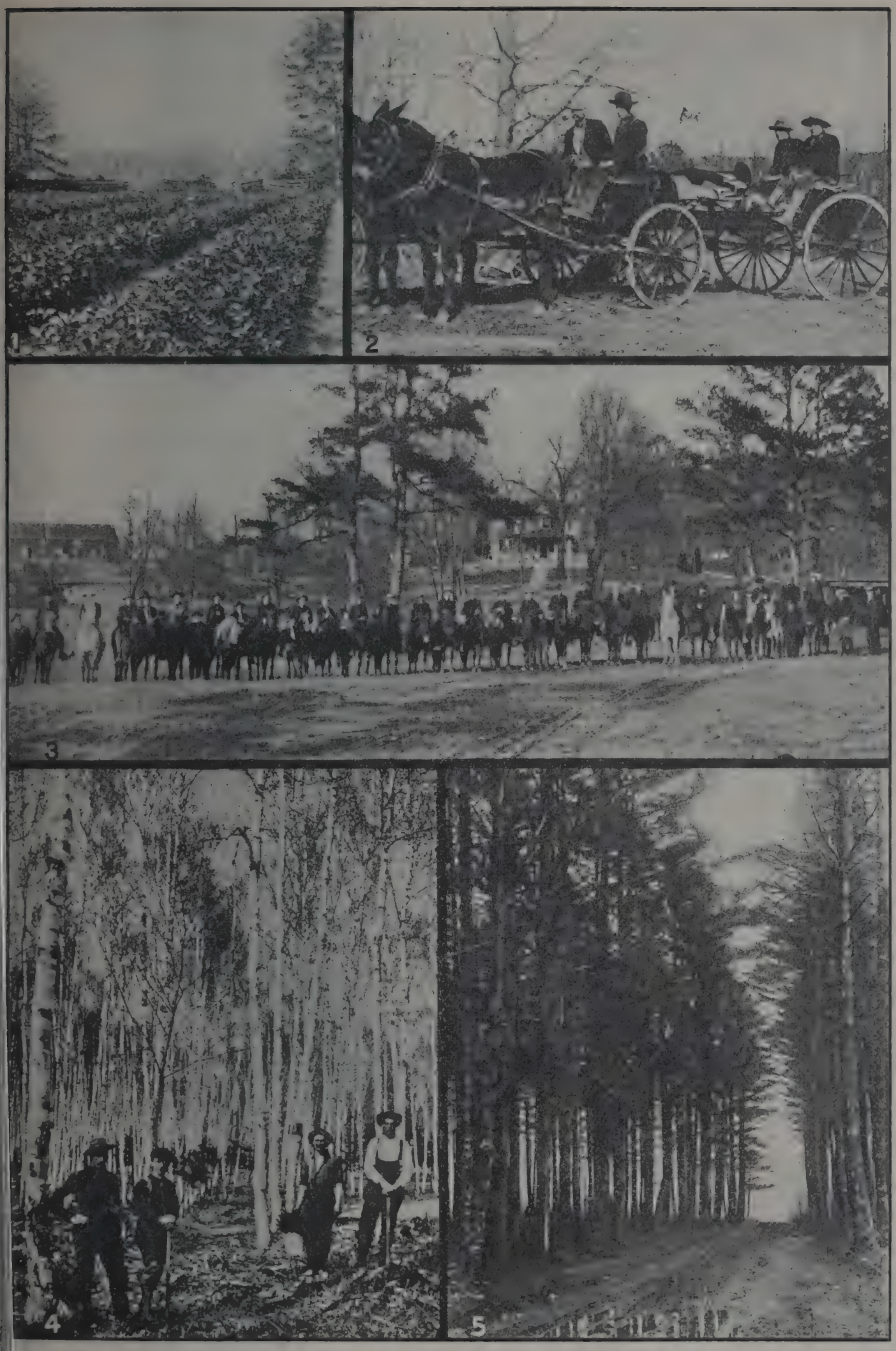
The New York State nurseries, in April and May, 1907, contained 549,450 4-year-old transplants of white pine, Norway pine, Scotch pine, Norway spruce, and European larch, ready for planting. In addition, an importation has been made from Germany to complete an even million trees, to be set out this spring. A crew of 100 men, under the charge of two professional foresters, will do the work (Pl. LXV, fig. 4). A 10-acre nursery will be established in central New York for propagating stock for free distribution and to furnish shade trees for the good-roads system. A new feature is the creation of a patrol of the Adirondack railroads during the spring months. This contemplates a force of 100 men, distributed along the steep railroad grades and at places in the forest where conditions are the most dangerous. This railroad patrol is entirely separate from the fire-warden system, the patrols being paid directly from the Albany office. At the end of the year the railroads refund to the State one-half the expense. During the summer of 1907 seed-spot sowing was carried on, and a field experiment station started. Fifteen species of seeds have been planted in various ways. The most hopeful experiment is one in which seed is dropped on the unbroken ground at 5-foot intervals, and the seed at each spot covered with a handful of sand. Western yellow pine seed planted in this way produced trees in nearly every spot. An experiment was made with white pine, by putting a handful of black muck on the unbroken ground, placing a few seeds on the muck, and covering the seed with sand.

During the past year forest work in North Carolina has been confined to the swamp lands near the coast, which are owned by the State board of education. After an examination most of these forest lands were withdrawn from sale until it could be definitely determined whether it is better to sell the land outright, to sell the timber on the stump and have it cut under the supervision of a forester, or to sell all the timber and clear the land for agricultural purposes. In a number of cases it is evidently the better policy to keep the forests and make them a perpetual source of income to the State. These examinations have also encouraged the drainage of swamp lands, especially a 44,000-acre tract which belongs to the State, part of which is good forest land. A forester has been employed, who will carry out plans regarding the State lands and take up questions regarding general State forestry. The State owns 700,000 acres of forest land, and its forest interests are second only to those of agriculture.

A very successful plan in Ohio of cooperating with landowners in establishing plantations and maintaining their timber tracts in such condition that they will serve as educational examples in correct forest practice has been extended until practically every county in the State has been covered. This includes the preparation of plans for managing woodlots and timber tracts and the furnishing of planting material which will be grown according to plans and instructions furnished. A total of 466 farmers are thus cooperating with the State experiment station. A State forest survey has been begun.

The Pennsylvania department of forestry has during the past year directed most of its attention and energy to the acquiring of new land, the establishing of good nurseries, and the pushing of reforestation work. The State now holds in forest reserve lands about 10 per cent of the area of timberland of the Commonwealth. The nursery area has been increased to over 12 acres, and in another year the number of seedlings will be more than doubled. There are at present, in three nurseries, a total number of 2,250,000 seedlings, of which about 8 per cent are hardwoods, the remainder being conifers, mostly white pine. The reserves are being improved and roads are being opened and built in order to make the land accessible and to serve as fire lines. Special attention is paid to the control of forest fires, and losses are very greatly decreasing (Pl. LXV, figs. 2 and 3). Fire-killed timber is utilized. A successful experiment with small fire-killed timber was made some time ago in the burning of charcoal. A forest academy is maintained directly by the Department for the training and education in forestry of young men of the State for work on the forest reserves, and to speak to public schools, teachers' institutes, and farmers' institutes. The school has made wonderful development and has now under construction a new and thoroughly modern red stone building to be used for dormitory and lecture rooms, together with thoroughly equipped laboratories.

The second annual report of the State forester of Rhode Island discusses general forest conditions, methods of lumbering, stumpage prices, and the problems of forest taxation and fires. The report states that the 250,000 acres of unimproved land of the



FIRE PATROL AND SILVICULTURE IN STATE FOREST WORK.

1. Beds of white ash seedlings, ready for distribution, in the Massachusetts State Nursery. 2. Fire wagon, the latest equipment for fighting forest fires in Pennsylvania. 3. Students of the Pennsylvania State Forest Academy responding to a fire call; an important part of the training is to learn the surest and quickest methods of extinguishing forest fires. 4. Underplanting white birch with pine and spruce seedlings in the Adirondack Preserve. 5. Possibilities of second growth in New England; white pine, 50 years old, recently thinned with a profit of $44.32 per acre under the direction of the Connecticut State forester.

State should yield 40,000,000 board feet of lumber and 125,000 cords of fuel per annum, worth $1,175,000. The present income from this source, according to the State census of 1905, is $697,593. Landowners have applied for advice in the management of a woodland aggregating 2,250 acres.

The State experiment station of Vermont issued a bulletin entitled "Forest Planting in Vermont," which will greatly promote the practice of forestry. The State nursery has been increased in capacity for supplying plant material to farmers in the State, and to avoid delay while stock is growing here seedlings have been secured from the New York State nurseries.

The progress of forest work in Washington for the past year is especially marked by increased activity on the part of the State and owners of timberlands to protect the timber from fire, the inauguration of forest instruction at the University and at the Agricultural College at Pullman, and the better appreciation by the people of the National forest policy. The work of the deputy fire wardens in the several counties of the State entirely prevented destructive timber fires. About one hundred forest rangers were appointed, usually at the request of mill men and timberland owners by whom they were employed. At a meeting of prominent lumbermen in Seattle a ranger service was organized for the fire season of 1908. This organization represents some 4,000,000 acres of timberland, and it is the plan to assess holdings at the rate of 1 cent an acre for fire protection. Other timber holders of the State are doing something in the same line. One company, for example, has a force of men in the field which is as effective as the State force.

The West Virginia State Board of Trade has appointed a committee to investigate State forest conditions and recommend to the State legislature the enactment of laws which will promote forest preservation.

During 1907 the most important forest work in Wisconsin was the appraising and selling of scattered and agricultural lands and the use of the proceeds to purchase other lands suitable only for forestry, so as to consolidate the main forest reserves on the headwaters of the Wisconsin and Chippewa rivers. About 15,000 acres have recently been purchased. Concessions have been granted private capitalists to store water at the headwaters of streams, the promoters to reap benefit from the sale of waterpower. Much interest centers in this attempt of private capital to establish reservoirs which will operate in conjunction with the forest cover in the regulation of streams.

FOREST LEGISLATION.

More new and amendatory forest legislation was enacted by the State legislative assemblies from December 1, 1906, to December 1, 1907, than during any previous year. The following is a brief summary of the laws passed by Congress and the State legislatures during that period:

United States.—Salary of the Forester increased from $3,500 to $5,000 per annum (34 Stat., 1269); $100,000 appropriated to continue surveys of National Forests (34 Stat., 1336); $25,000 for Appalachian and White Mountain survey and report (34 Stat., 1281); Forest reserves to be known hereafter as National Forests (34 Stat., 1269); Forest reserve special fund abolished, and annual appropriation for National Forests increased from $900,000 to $1,900,000 as compensation; payment of expenses incurred for protection and care of fish and game supplied to stock National Forests was authorized; purchase of technical books and journals for officers outside of Washington authorized (34 Stat., 1270); creation of new and additions to existing National Forests in Oregon, Washington, Idaho, Montana, Colorado, or Wyoming forbidden, except by act of Congress (34 Stat., 1271); certain townships in Black Hills National Forest placed within operation of agricultural settlement act of June 11, 1906 (act of February 8, 1907, 34 Stat., 883); certain National Forest lands granted to the cities of Durango, Colo. (34 Stat., 1053), and Boulder, Colo. (34 Stat., 1223), for water-supply purposes.

Alabama.—State commission of forestry created, to serve without compensation or expense to the State; governor authorized, upon recommendation of commission of forestry, to accept gifts to State of lands to be administered as State forest reserves, commission to investigate and report annually on forest conditions and recommend legislation; county game and fish wardens declared forest wardens with authority of peace officers, and all peace officers ex officio forest wardens; appointment of deputy forest wardens without compensation authorized; owners of land not exceeding assessed value of $5 per acre allowed to contract with commission of forestry to plant and protect timber trees on such land, and secure its exemption from taxes for ten years. Counties authorized to appropriate $250 annually as salary for their forest warden; provisions enacted against setting and spread of fires, use of engines without spark arresters, and attaching electric wires to, or, without consent of mayor, mutilating

trees along streets; moneys received as penalties and from State forest reserves to constitute forest reserve funds, available for forest administration; $500 annually appropriated; consent of State given to acquisition by the United States of land for a National Forest (act approved November 30, 1907).

California.—Substance of Penal Code, sections 384, 384a, and 384b, incorporated in and enlarged upon by amendment of section 384; stringent regulations against setting and spread of fires, use of engines without spark arresters, and blasting wood during "dry season" without permit from State or district fire warden; rendering assistance to fire warden made compulsory; one-half of fines to be paid to forest fund (ch. 536, laws of 1907); $5,000 appropriated (ch. 177, laws of 1907), to be expended under direction of State department of engineering (ch. 183, sec. 13, laws of 1907) in cooperation with United States Forest Service in construction of fire lanes and trails for protection of the south slope of the San Bernardino Mountains.

Connecticut.—Section 1221, general statutes, amended to increase surrounding space, which must be cleared before a fire is started (ch. 43, laws of 1907); sections 3, 4, and 5, chapter 238, public acts of 1905, amended, making fire chiefs in consolidated town and city governments ex officio fire wardens and improving fire regulations (ch. 136, laws of 1907).

Florida.—Cutting, removing, or working in any manner for turpentine purposes any timber forbidden under penalty of fine or imprisonment or both when any tax-sale certificates are outstanding and unredeemed against the land or timber or the turpentine privileges on such lands (ch. 5683). Approved June 3, 1907. Penalty for unauthorized, willful cutting, scraping, destroying, or injuring of standing trees, title to which is in another, made the same as for theft of personal property of equal value (ch. 90, laws of 1907).

Idaho.—Sections 10, 11, 12, and 13 of House bill 131 (laws of 1905, p. 145) repealed; provision made for division of State into fire districts, and appointment, with police powers, of district fire wardens to be paid by property owners requesting such appointment; a "close season" and stringent and comprehensive fire regulations established; clearing of railroad rights of way required; posting of fire laws and regulations provided (H. B. 61, session laws of 1907, p. 18).

Indiana.—Granting of rights of way over State forest reservation, laboratory of forest demonstration, and nurseries, to railroad, telegraph, and telephone companies provided (ch. 57, laws of 1907).

Kansas.—Appointment of two commissioners of forestry, each to be in charge of one of the two State forest experiment stations, provided for. Duty of each commissioner to devote entire time to improvement of his forestry station and to investigation and experiment; to furnish seedlings free to residents of the State; to disseminate information, and upon petition of 25 persons to hold meetings in any county. Expenses and salary of $1,000; $5,600 per year appropriated (ch. 405, laws of 1907).

Maine.—Specification 10, section 6, chapter 9, revised statutes (forest land exemption), amended to exempt from taxes, under certain conditions, such timber lands *hereafter* planted and cultivated (ch. 169, laws of 1907).

Massachusetts.—Salary of State forester increased from $2,000 to $3,000; new provisions as to his expenditures (ch. 473, laws of 1907); sections 16 and 20, chapter 32, revised statutes, amended; sections 17, 18, and 22, chapter 32, and section 14, chapter 53, repealed; appointment of forest wardens in cities and towns provided for, and expenditure of $2,000 annually on forest warden conventions, including traveling expenses of wardens, authorized (ch. 475, laws of 1907); commissioners on fisheries and game given power to arrest those found unlawfully setting fire (ch. 299, laws of 1907).

Michigan.—Office of State game, fish, and forestry warden created, with combined duties of game and fish warden, commissioner of State land office as forest commissioner, and chief fire warden; salary of $3,000 and expenses (act 106, laws of 1907); special commission of inquiry on tax lands, forestry, forest fires, and forest legislation created, expenses paid, no salary (act 188, laws of 1907); fire warden law of 1903 repealed; new act providing township supervisors to be fire wardens; not exceeding 10 district deputy game, fish, and forestry wardens, with $1,000 salary, police power in enforcing fire laws, and power to employ assistance (act 317, laws of 1907); lands of State agricultural College in Iosco and Alcono counties withdrawn as forest reserve (act 299, laws of 1907).

Minnesota.—Section 2205, revised laws of 1905, amended; governor ex officio member of State forestry board (ch. 171, laws of 1907); $2,500 appropriated for planting evergreens on Pillsbury Reserve, Cass County (ch. 351, laws of 1907); Itasca State park made a forest reserve under State forestry board; $2,000 appropriated for demonstration work on said reserve, and $1,500 for fire breaks and other improvements; board of regents of State University authorized to undertake forestry work in conjunction with State forestry board (ch. 90, laws of 1907).

Montana.—State game and fish warden and deputies made ex-officio State fire warden and deputies with duty to protect the timber within the State and especially that owned by the State from fire. May employ men in emergencies and incur necessary expenses. Authority to arrest for violation of fire laws (ch. 147, laws of 1907).

New Jersey.—State board of forest park reservation commissioners authorized to change fire districts and appoint wardens at joint expense of State and townships (ch. 9, laws of 1907); to acquire certain lands as part of State forest park reservation and make rules and regulations (ch. 143, laws of 1907).

New York.—Section 229, forest, fish, and game law of 1900, as amended by chapter 186, laws of 1903 (fire penalty), further amended by reducing minimum penalty (ch. 667, laws of 1907).

Oregon.—A nonpartisan State board of forestry created to investigate forest conditions, suggest legislation, and supervise and give publicity to matters pertaining to forestry; may incur $500 expenses, but receive no compensation; property owners willing to pay forest wardens may secure appointment of citizens as such; State and county officials and resident officers of National Forests may be appointed ex officio forest wardens; a "close season" established, during which fire can not, except under special precautions and subject to special liability, be used without permit from a State fire warden; permits contain restrictions and are revocable for cause; stringent legislation enacted against setting and spread of fire; use of spark arresters and clearing of railroad rights of way required; chapter 227, general laws of 1905, repealed (ch. 131, laws of 1907).

Pennsylvania.—Constables and employees of department of forestry made fire wardens with power to compel assistance; two-thirds of compensation and expense to be repaid to the county by the State; $40,000 appropriated by the State (ch. 86, laws of 1907); special provisions for protection of forest lands containing oil and gas wells (ch. 334, laws of 1907).

Rhode Island.—Allowance for traveling expenses of commissioner of forestry, together with cost of printing and supplies, reduced from $500 to $300 (ch. 1465, laws of 1907).

Tennessee.—Duties of department of game, fish, and forestry, respecting trespass, forestry, and forest fires, defined; special provisions against trespass and spread of fire by engines and charcoal burners; certain lands may be donated to State for forestry purposes; forest policy outlined; cooperative investigation with United States Forest Service authorized. Wardens authorized to summon emergency help for fighting fires; misdemeanor to disobey summons; $3 per day allowed for such compulsory service (ch. 397, laws of 1907).

Vermont.—Provisional appropriation of $500 per year for five years to aid Vermont agricultural experiment station in establishment and maintenance of nursery for forest seedlings; material for planting to be furnished at cost within State, and skilled assistance provided (ch. 15, laws of 1906, approved December 16, 1906).

Washington.—Annual salary of State fire warden and forester increased from $1,500 to $2,000 (ch. 201, laws of 1907).

Wisconsin.—Tax exemptions provided for certain lands devoted to forest culture (ch. 592, laws of 1907); State board of forestry authorized to appraise, preparatory to selling to United States, all State lands and timber within Indian reservations; moneys from such sales, except when otherwise disposed of by constitution, to be expended only in purchase of State forest reserves (ch. 96, laws of 1907); State may purchase lands north of town 33; $10,000 per annum appropriated (ch. 491, laws of 1907); State park board created, to work in conjunction with director of State geological survey and State forester; $500 appropriated (ch. 495, laws of 1907); in granting private corporation privilege to dam and improve Wisconsin River, certain supervision and control over its operations given State board of forestry (ch. 335, laws of 1907).

Wyoming.—Misdemeanor to light and leave fire in any woods or prairies without extinguishing (ch. 22, laws of 1907).

NATIONAL FOREST OFFICERS.

Gifford Pinchot, Forester, Washington, D. C.; Overton W. Price, Associate Forester, Washington, D. C.

STATE FOREST OFFICERS.

State or Territory.	Name and post-office.	Official position.
Alabama	John Wallace, jr., Montgomery	Secretary, State forest commission.
California	Gerard B. Lull, Sacramento	State forester.
Connecticut	Austin F. Hawes, New Haven	Do.
Hawaii	Ralph S. Hosmer	Superintendent of forestry.
Indiana	W. H. Freeman, Indianapolis	Secretary, State board of forestry.
Kansas	Henry Cooper, Dodge City	Commissioner of forestry.
	F. H. Ridgway, Ogallah	Do.
Kentucky	Hubert Vreeland, Frankfort	Chairman, State board of agriculture, forestry, and immigration.
Louisiana	A. W. Crandell, Baton Rouge	State forest commissioner.
Maine	Edgar E. Ring, Augusta	Land agent and forest commissioner.
Massachusetts	F. Wm. Rane, Boston	State forester.
Maryland	F. W. Besley, Baltimore	Do.
Michigan	Wm. H. Rose, Lansing	Secretary, forestry commission.
	Filibert Roth, Ann Arbor	State forest warden.
Minnesota	Gen. C. C. Andrews, St. Paul	Secretary, State forestry board, and forestry commissioner.
Mississippi	A. F. Crider, Biloxi	Director, State geological survey.
New Hampshire	R. E. Faulkner, Keene	Secretary, forest commission.
New Jersey	Alfred Gaskill, Trenton	Secretary, forest park reservation commission, and forester.
New York	Wm. F. Fox, Albany	Superintendent of State forests.
	C. R. Pettis	Forester.
North Carolina	Joseph H. Pratt, Chapel Hill	State geologist.
Ohio	Charles E. Thorne, Wooster	Director, State agricultural experiment station.
Oregon	J. W. Baker, Cottage Grove	Forestry, fish, and game warden.
	E. P. Sheldon, Portland	Secretary, forestry commission.
Pennsylvania	Robert S. Conklin, Harrisburg	Commissioner of forestry.
	George H. Wirt, Harrisburg	State forester.
	J. P. Wentling, Mont Alto	Forester.
Rhode Island	Jesse D. Mowry, Chepatchet	Commissioner of forestry.
Tennessee	C. A. Keffer, Knoxville	Secretary, Tennessee forest commission.
Vermont	Arthur M. Vaughn, Randolph	Commissioner of forestry.
Washington	R. W. Condon, Port Gamble	Chairman, department of forestry.
	J. R. Welty, Olympia	State fire warden and forester.
West Virginia	I. C. White, Morgantown	Superintendent, geologic and economic survey.
Wisconsin	Edward M. Griffith, Madison	State forester.

FOREST ASSOCIATIONS.

American Forestry Association.—President, Hon. James Wilson, Secretary of Agriculture; secretary, Thomas E. Will, Washington, D. C.; treasurer, Otto Luebkert, Washington, D. C.

The Appalachian National Forest Association.—President, D. A. Tompkins, Charlotte, N. C.; secretary and treasurer, John H. Finney, Washington, D. C.

International Society of Arboriculture.—President, Gen. William J. Palmer, Colorado Springs, Colo.; vice-president, Henry John Elwes, F. R. S., Colesborne, Cheltenham, England; secretary, J. P. Brown, Connersville, Ind.

Society of American Foresters.—President, Gifford Pinchot, Washington, D. C.; secretary, W. F. Sherfesee, Washington, D. C.

State organizations.

Name of organization.	Secretary.	Address.
Appalachian Mountain Club	R. B. Lawrence	Tremont Bldg., Boston.
Arizona Salt River Valley Water Users' Association.	Chas. A. Van der Veer	Phoenix, Ariz.
California:		
Water and Forest Association	T. C. Friedlander	45 Mills Bldg., San Francisco.
Forestry Educational Association	E. C. Damon	San Diego.
Sierra Club	William E. Colby	San Francisco.
Forest and Water Society of Southern California.	Wm. H. Knight	Los Angeles.
Pacific Coast Forest, Fish, and Game Association.	Wm. Greer Harrison	San Francisco.
Tri-Counties Reforestation Committee.	L. A. Finch	Riverside.
Cincinnati Forest and Improvement Association.	Adolph Leue	127 West Twelfth st.
Colorado Forestry Association	W. G. M. Stone, president	Denver.

State organizations—Continued.

Name of organization.	Secretary.	Address.
Connecticut Forestry Association	Miss Mary Winslow	Weatogue.
Georgia Forestry Association	Alfred Akerman	Athens.
Iowa Park and Forestry Association	Wesley Greene	Des Moines.
Maine Forestry Association	E. E. Ring	Augusta.
Massachusetts Forestry Association	Edwin A. Start	4 Joy st., Boston.
Michigan Forestry Association	J. Fred Baker	East Lansing.
Minnesota State Forest Association	E. G. Cheyney	St. Anthony Park.
Nebraska Park and Forestry Association	L. B. Craig	York.
New England Forest, Fish, and Game Association.	Walter L. Hill	Pierce Building, Boston.
New Hampshire Society for the Protection of New Hampshire Forests.	Allen Hollis	Concord.
New York:		
State Fish, Game, and Forest League	John D. Whish	Capitol, Albany.
Forestry, Water Storage, and Manufacturing Association of the State of New York.	John C. Durgin	1 Broadway, New York.
Association for the Protection of the Adirondacks.	E. H. Hall	Tribune Bldg., New York.
Northern New York Forestry Association.	O. B. Tappan, director	Potsdam.
American Forest Preservation Society.	George Milroy Bailey	Corfu, N. Y.
North Dakota State Sylvaton Society	Miss Ella J. Mitchell	Penn, N. Dak.
Ohio State Forestry Society	C. W. Waid	Wooster.
Oregon Forestry Association	A. D. Monteith	Portland.
Pennsylvania Forestry Association	F. L. Bitler	1012 Walnut st., Philadelphia, Pa.
Pennsylvania Franklin Forestry Society	W G. Bowers	Chambersburg.
Vermont Forestry Association	Ernest Hitchkock	Pittsford.
Washington Forestry Association	Edmund S. Meany	Seattle.
West Virginia Forestry Association	A. W. Nolan	Morgantown.

SCHOOLS OF FORESTRY.

Post-Graduate Schools.

Yale University, Forest School, New Haven, Conn.—A two years' post-graduate course, leading to the degree of Master of Forestry. Under the direction of the officers of the Yale Forest School, a two months' summer course, July and August, is conducted at Milford, Pike County, Pa. Prof. Henry S. Graves, Director.

University of Michigan, Forest School (part of the general Department of Literature, Science, and the Arts), Ann Arbor, Mich.—A two years' post graduate course, leading to the degree of Master of Science in Forestry. A six weeks' summer course, in July and August, is conducted on the State reserve at Roscommon. Prof. Filibert Roth, Professor of Forestry.

Harvard University, Forest School, Cambridge, Mass.—A two years' graduate course, in connection with the Graduate School of Applied Science. Prof. R. T. Fisher, in charge of curriculum.

Undergraduate Schools.

Biltmore Forest School, Biltmore, N. C.—Course covers one full year, leading to the degree of Bachelor of Forestry, and, with two years of practical forest work, the degree of Forest Engineer. Dr. C. A. Schenck, Director.

University of Minnesota, School of Forestry, St. Anthony Park, Minn.—A four years' undergraduate course, leading to the degree of Bachelor of Science in Forestry. A six weeks' summer course, in July and August, is conducted at the Itasca State Forest. Prof. Samuel B. Green, Professor of Forestry.

University of Nebraska, Department of Forestry, Lincoln, Nebr.—A four years' undergraduate course, leading to the degree of Bachelor of Science. Frank J. Phillips, Professor of Forestry.

Michigan State Agricultural College, Department of Forestry, East Lansing, Mich.—A four years' undergraduate course, leading to the degree of Bachelor of Science. J. Fred Baker, Professor of Forestry.

Pennsylvania State College, Forest School, State College, Pa.—A four years' undergraduate course, in connection with the State Department of Agriculture, leading to the degree of Bachelor of Science. Hugh P. Baker, Professor of Forestry.

University of Washington, School of Forestry, Seattle, Wash.—A four years' undergraduate course leading to the degree of Bachelor of Science in Forestry. Frank J. Miller, Professor of Forestry.

University of Georgia, Department of Forestry, Athens, Ga.—A four years' undergraduate course, leading to the degree of Bachelor of Science in Forestry. Alfred Akerman, Professor of Forestry.

Colorado School of Forestry, Colorado Springs, Colo.—A three years' undergraduate course, leading to the degree of Bachelor of Forestry. No entrance requirements. A summer course is conducted at Manitou Park from July 15 to September 15.

The Mont Alto Forest Academy, Mont Alto, Pa.—Maintained by the Pennsylvania Department of Forestry for the training of young men of the State for work on the State forest reserves. Geo. H. Wirt and J. P. Wentling, in charge of forest courses.

Courses in forestry are now given at the University of Maine, Orono, Me., Gordon E. Tower, in charge; Iowa State College, Ames, Iowa, Chas. A. Scott, in charge; Mississippi Agricultural and Mechanical College, Agricultural College, Miss., Geo. L. Clothier, in charge; Purdue University, Lafayette, Ind., Prof. Stanley M. Coulter, in charge; Berea College, Berea, Ky., W. L. Flanery, in charge; State College of Washington, Pullman, Wash., E. O. Siecke, in charge; Winona Agricultural Institute, Winona Lake, Ind., W. R. Eastman, in charge; North Dakota School of Forestry, Bottineau, N. Dak., J. Allen Kemp, president.

A course of lectures is given annually at the Massachusetts State Agricultural College, Amherst, by Prof. Frank Wm. Rane, State Forester of Massachusetts; at the Maryland Agricultural College, College Park, by Fred W. Besley, State Forester of Maryland; at the University of Wisconsin, Madison, by Edward M. Griffith, State Forester of Wisconsin; at the Agricultural College of Utah, Logan, by W. W. Clark; at the Connecticut Agricultural College, Storrs; and at the State Agricultural College of Colorado, Fort Collins.

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