

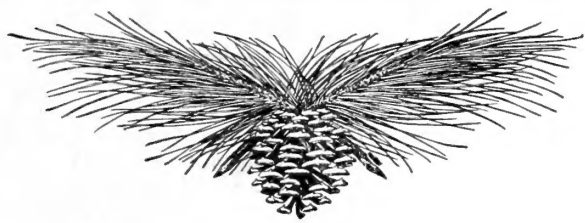
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FOREST WORKER



March, 1929

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Essay Prizes Offered by Society of American Foresters

Two prizes, of \$1,000 and \$250, respectively, are being offered by the Society of American Foresters in a forestry essay contest as the result of an anonymous gift for that purpose. The contest is open to anyone desiring to compete. Conditions are announced by the society as follows: "Essays submitted shall cover, first, the actual forestry situation in the United States to-day; second, a nation-wide remedy which (a) will, if applied, solve the problem of a permanent and sufficient supply of forest products and secure other benefits of forests essential to the public welfare; (b) will be applicable in actual practice; and (c) can be applied in time to meet the Nation's needs. The essays must be based not on hypothetical assumptions but on the actual situation in the United States to-day."

The essays must not exceed 3,000 words, exclusive of a summary of conclusions that should be presented at the beginning of the paper. They must be typed, and each should be signed with a pseudonym. A sealed envelope containing the author's real name and bearing the pseudonym on the outside should be transmitted with the essay.

The winning essays are to be published in the *Journal of Forestry*. Other essays submitted may be chosen by the committee of award for publication in the *Journal*. Essays not so published will be returned if the authors request their return and provide postage.

The committee reserves the right to withhold the prizes if no essays that are in their judgment worthy of the award are received.

Essays submitted should be forwarded, in time to be received not later than September 30, to either of the two members of the committee of award, namely, S. T. Dana, School of Forestry and Conservation, University of Michigan, Ann Arbor, Mich., and Raphael Zon, Lake States Forest Experiment Station, University Farm, St. Paul, Minn.

Forest Service Motion Pictures May be Purchased

Authority for the purchase of motion-picture films on forestry subjects prepared by the United States Forest Service may be obtained by addressing the Department of Agriculture, Washington, D. C. The cost of the films is about \$30 per reel of 1,000 feet. Persons or organizations purchasing films must agree not to make changes in the subject matter of the films. They must also agree to retain the department's credit line in the film and not to insert any commercial advertising matter. Lists and descriptions of the available films may be obtained by addressing the United States Forest Service, Washington, D. C.

During the second half of 1928, 28 Forest Service motion pictures were purchased by outside agencies.

The *FOREST WORKER* is published by the Forest Service, United States Department of Agriculture, Washington, D. C. L. C. Everard, editor. Jean Kerr, assistant editor. Material offered for publication in the *FOREST WORKER* should be addressed to the editor.

Because the free edition is necessarily limited, this periodical can be distributed without charge outside of the Government service only to such persons and organizations as State forestry and conservation officials, State agricultural extension directors, faculties and libraries of forest schools, and forestry associations. Others desiring to obtain copies of the *FOREST WORKER* can do so by sending 5 cents for a single copy or 25 cents for a year's subscription to the Superintendent of Documents, Government Printing Office, Washington, D. C. Foreign subscriptions: Yearly, 35 cents; single copies, 7 cents.

FOREST WORKER

Washington, D. C.

MARCH, 1929

Vol. 5, No. 2

State Forestry

States, Municipalities, and Counties Increase Forest and Park Holdings

During the last three calendar years 1,755,658 acres of land in the United States has been brought under State forest management. The total area of State forests now stands at 6,556,735 acres. The greatest extension effected in the 3-year period by a single State is the 1,200,000 acres reported by Washington. Pennsylvania has added 167,788 acres to its 1925 total, and Michigan is a close third with an increase of 167,000 acres. Acreage added to the State forests of other States is as follows: Connecticut, 20,000; Indiana, 1,453; Louisiana, 3,700; Maryland, 5,247; Massachusetts, 12,000; Minnesota, 70,000; New Hampshire, 8,605; New Jersey, 7,002; New York, 80,587; Ohio, 6,075; Texas, 62; Vermont, 1,729; West Virginia, 227; Wisconsin, 3,000. In Idaho, 700,000 acres listed in 1925 as State forest land is not so classified in 1929.

At the end of 1928 State forests were reported by three States that at the end of 1925 reported none—Delaware, Georgia, and South Carolina.

Three years' growth in the total of State park areas in this country has added 98,834 acres to the 1925 figure, less 31,000 acres in Wisconsin no longer listed as State park land. This makes the total 436,077 acres. The acreage set aside for State park purposes since 1925 is distributed as follows: Arkansas, 1,023; California, 969; Connecticut, 1,000; Florida, 2,080; Georgia, 10; Illinois, 878; Indiana, 570; Louisiana, 250; Massachusetts, 2,000; Michigan, 17,255; Missouri, 9,655; Nebraska, 253; New York, 56,788; Oregon, 3,054; Rhode Island, 1,717; Vermont, 1,332.

In boosting the total area of municipal and county forests and parks from 697,447 acres at the end of 1925 to 726,577 acres at the end of 1928, the acreage devoted to these purposes was increased in seven States and the District of Columbia as follows: District of Columbia, 409; Illinois, 1,452; Maryland, 5,140; Massachusetts, 3,97; New York, 4,426; Ohio, 4,416; Rhode Island, 2,396; Vermont, 2,037. Connecticut reports 543 acres less under this classification on the latter than on the former date. Louisiana and Missouri, which reported no forests in this category three years ago, now report 1,000 acres and 5,000 acres, respectively.

Areas of forest land owned by States and by municipalities and counties on January 1, 1929, as reported to the United States Forest Service by the individual States, are as follows:

State	Forest land owned by States			Municipal and county forests and parks	Total
	Forests	Parks	Other		
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>
Alabama.....	175,000			19,232	194,232
Arizona.....	41,255				41,255
Arkansas.....		1,023			1,023
California.....		13,814	50,000	7,640	71,454
Colorado.....			100,000	44,449	144,449
Connecticut.....	40,000	8,000	2,000	15,000	65,000
Delaware.....	50				50
District of Columbia.....				3,833	3,833
Florida.....		4,000			4,000
Georgia.....	166	10			176
Idaho.....		7,200	984,800	160	992,160
Illinois.....		2,098	16,000	32,030	40,128
Indiana.....	5,000		5,000	12,000	22,000
Iowa.....		7,000	5,000		12,000
Kansas.....		245		200	445
Kentucky.....	3,624		15,000		18,624
Louisiana.....	5,900	250	282,000	1,000	289,150
Maine.....	100	25	330,000	835	330,960
Maryland.....	9,082		6,986	19,910	35,978
Massachusetts.....	109,000	14,000	48,000	56,000	227,000
Michigan.....	500,000	25,000	782,000	3,495	1,310,495
Minnesota.....	420,000	38,279	580,000	7,635	1,045,914
Mississippi.....					
Missouri.....		35,155	46,000	5,000	86,155
Montana.....	566,000				566,000
Nebraska.....		1,000	500	14,000	15,500
Nevada.....					
New Hampshire.....	29,143		1,600	10,612	41,355
New Jersey.....	25,956	16,000	4,000	35,230	81,186
New Mexico.....			185,000		185,000
New York.....	2,107,328	140,000	15,500	175,000	2,437,828
North Carolina.....		1,724	85,600	37,257	124,581
North Dakota.....		250	17,300		17,550
Ohio.....	39,848	32,510	22,900	18,283	113,541
Oklahoma.....			27,300		27,300
Oregon.....		3,694	77,868	166,406	247,968
Pennsylvania.....	1,299,673	9,541	2,624	14,996	1,326,834
Rhode Island.....		1,717		2,500	4,217
South Carolina.....	967				967
South Dakota.....			80,000		80,000
Tennessee.....			98,110		98,110
Texas.....	5,694	550	50,000	1,500	57,744
Utah.....			66,000	1,710	67,710
Vermont.....	32,233	1,492	713	8,000	42,438
Virginia.....		588	1,500	9,700	11,788
Washington.....	1,240,763	6,500		14,964	1,262,227
West Virginia.....	15,620				15,620
Wisconsin.....	100,000	60,000	192,000		352,000
Wyoming.....			23,000		23,000
Total.....	6,556,735	436,077	4,417,556	726,557	12,136,945

¹ Mostly marsh, game preserves, and shooting grounds.

² Including 77,000 acres of swamp land.

³ Approximate.

⁴ Described as "forest and park" land.

Oregon's New Forest Taxation Law

The forest taxation law enacted in February, 1929, by the State of Oregon is outstanding in that it provides for systematic and immediate classification of forest lands on a statewide basis and without dependence on special contracts between the State and the landowners.

For application to lands which are better suited for forest production than for any other use, and on which the forest crop or crops are not mature in merchantable quantities, this law sets up a 5 cents per acre annual fee and a 12½ per cent yield tax in lieu of all ad valorem property taxes. Under this law it becomes the duty of the State board of forestry to prepare lists of lands that in the judgment of the board may be classified as reforestation lands and to forward these lists to county assessors. Hearings on the proposed classification are to be held by the board at county court houses. Having reconsidered its classification in the light of testimony brought out at these hearings the board is to send its recommendations, with records of the hearings, to the State tax commission, which will finally determine the classification. Appeal from decisions of the board or the commission may be taken to circuit court. On or before October 1 of each year the board is to determine what lands not yet classified as reforestation lands should be so classified. Further proposals of the board for placing land under this classification are to be acted upon according to the procedure just described. Periodically, also, the board is to ascertain whether lands so classified are being protected as provided by law and are being used primarily for forest crop production. Any cases in which the findings are negative are to be presented to the State tax commission, which may "declassify" the lands in question. Owners of "declassified" lands will be required to pay the difference between the tax actually paid and the ad valorem tax for any period for which the latter should rightfully have been collected, under the same provisions as to payment of interest, penalty, and cost charges as apply to delinquent ad valorem taxes. The forest fee is to become a lien against premises on March 1 of each year, likewise under these provisions.

The act does not affect the application of ad valorem property tax laws to buildings, improvements, water and power rights, or any values other than forest values on lands taxed under its provisions.

No land that was valued and assessed for its forest growth on the 1928 tax rolls of the State is to be classed as "reforestation land" except with the approval of the county court or after the harvesting of the forest growth.

Before removing any forest crop from reforestation land the owner must obtain a written permit from the State board of forestry. Unit value of the crop is to be set by the board, subject to appeal to hearing before the board and from the action of the board to

the circuit court. In the absence of full assurance as to the financial responsibility of the permittee, the board is to require a bond indemnifying the State against any loss of yield tax revenue.

The number and kind of units of forest products harvested are to be reported by landowners under oath to the State board of forestry and, with the remittance of the yield tax, to the county tax collector, reports covering 6-month periods and being made in the first 15 days of January and the first 15 days of July.

All forest fees and yield taxes are to go to the county treasurer and be apportioned to the various taxing districts.

Authority is given to the State board of forestry to make orders, rules, and regulations necessary to carry out the purposes of the act.

The act provides, in addition, that on and after July 1, 1933, landowners desiring to enter into an agreement with the State to use lands for the growing and development of forest crops may do so, in cases in which in the judgment of the State board of forestry such an agreement will substantially accomplish the purposes of the act. The agreement will bind the landowner and his heirs and assigns to use the land for growing forest crops for a definite period not exceeding the board's estimate of the time necessary to mature the forest crop growing or to be grown on the land, and during the life of the agreement the land will be taxed as reforestation land as provided in the act. Any such agreement may be canceled by the board on 30 days' notice upon failure of the owner to comply with the terms and conditions of the agreement or with the forest laws of the State as these affect the lands covered by the agreement; or the agreement may be canceled, renewed, or transferred by mutual consent of the board and the landowner, if it is the judgment of the board that such action will in no way defeat the purposes of the act and if the State is protected against loss.

Members and authorized representatives of the State tax commission and the State board of forestry are authorized at any time to go upon any of the lands classified as reforestation lands. The board of forestry is authorized, also, to examine or cause to be examined any records bearing on the correctness of reports made in pursuance of the act.

The act provides that any person shall on request be granted a hearing before the board of forestry on any subject pertaining to activities of the board under the act affecting his property or interests as a taxpayer; and that any person affected by any decision of the board or the tax commission under the act may appeal from the decision, within 60 days, to the circuit court of the county in which land affected by the decision is located.

For failure to obtain a permit before cutting or to remit yield taxes within the periods appointed, the law sets the penalty of an additional yield tax of 10

per cent. This tax, with the 12½ per cent yield tax, will be a first lien against forest crops, collectible by writ of attachment with interest at 10 per cent. Falsification of returns or representations made under the provisions of the act is punishable by a fine of from \$100 to \$1,000 or imprisonment for from 30 days to 1 year, or both, the offender being still responsible for payment of any amount due under the act. Harvesting of forest crops from classified lands without permit is made a misdemeanor punishable by a fine of not more than \$1,000 or imprisonment in the county jail for not more than 6 months, or both.

Michigan's First Municipal Forest

By HAROLD TITUS, Michigan Conservation Commission

Traverse City, Mich., points with pride to its municipal forest as the first established within the State; and those of its citizens who have been most active in initiating the improvement feel that they have a very unusual combination of timber growing, game protection, and general recreational advantages.

The tract under administration is of approximately 1,000 acres, surrounding a municipal hydroelectric plant on the Boardman River. In 1924, its soil and cover conditions ranged all the way from excellently stocked swamp hardwood types to lean, badly burned, all but bald upland sand plains. In that year the area was constituted a game refuge under a State statute and was posted against the guns. The following spring the city commission, working with local sportsmen, called on the State department of conservation for advice as to what to do to improve the cover where improvement was obviously needed.

Marcus Schaaf, State forester, made a reconnaissance of the tract and laid out a planting program which, followed for three years, covered the areas that needed help in establishing a stand. At a planting "bee" the first spring 6,000 white pines were planted; in this nearly 200 men and women took part, and just so many different and personal interests in the project were awakened. The next year saw 35,000 white, jack, and Norway pine seedlings go into the ground, and the final planting was of 25,000 jack and Norway. These larger plantings were done partly by volunteers and partly by the city light and power department's construction crew. The resultant stands range from fair to excellent.

The State department of conservation has thrown a fire line around the boundaries of the project and maintains the line—which, fortunately, is in a strategic location in relationship to a considerable block of open country that needs special protection. Fire tools are kept at the power plant and during the fire season the tract is under constant observation from one of the State's lookout towers, which is located within a mile of the boundary.

While this Traverse City forest is small, its tree population is remarkable for variety of species and for wide range of age. Some forties are splendidly stocked with Norway pine that is already of merchantable size; islands of seed-producing white pines are scattered here and there; and in several places dense and relatively extensive stands of uniform young jacks are growing lustily.

Deer frequent the place, ruffed grouse and woodcock are abundant, and black duck annually nest in the quiet waters at the head of the pond. The Boardman River is an outstanding trout stream, and fishing has not been prohibited within the forest boundaries. In 1927 beaver were reintroduced, the animal having been extinct in the vicinity for a quarter of a century; they have established themselves within the sanctuary and apparently are having the time of their lives.

This forest is 14 miles from the city that owns it, and the roads leading to it are none too good. Nevertheless, because it presents such an impressive range of native trees and such an abundance of native animal and bird life it is constantly growing in popularity with the community and with summer tourists.

New York Acquires New Demonstration Forest

A recently completed purchase makes New York State the owner of a tract of 4,250 acres of land in Oswego County well adapted to its intended use as a demonstration forest and game refuge. This land, formerly the property of the Cleveland estate, of Watertown, N. Y., is bounded on the north by the Oswego-Jefferson county line, and is in compact form. Except for about 100 acres of old clearing it is entirely covered with an excellent stand of second-growth timber of both broad-leaved and coniferous species. The merchantable timber is estimated to average about 3 cords per acre. The entire area is within the range of the Castor Hill State fire-observation station.

New York Builds Repair Shop for Fire Equipment

At Saranac Inn, N. Y., the State conservation department has built a storehouse and repair shop where all its fire-fighting equipment can be overhauled and repaired. Combined with the shop is a dormitory accommodating 12 men. The 58 high-pressure fire pumps belonging to the department were all sent to the shop for overhauling and repair during the present season. In December and January nine rangers from other sections of the State were detailed to the shop to assist in the repair work. Other work to be carried on during the winter months by men stationed at the shop includes the construction of equipment to be placed at public camp sites and the pruning and thinning of forest plantations.

Two Proposed Forestry Laws for New York

As an outgrowth of investigations by the temporary reforestation commission created in 1928 by the New York Legislature two bills have been introduced in the legislature by Senator Hewitt. One of these would amend the conservation law so that lands outside of the forest-preserve counties might be acquired by the State for forestation, by purchase or gift. The minimum area for each tract acquired under this amendment would be 500 acres. The land would be chosen on the basis of suitability for the establishment and maintenance of forests, the growth of timber and other forest products, and recreation and kindred purposes. It would be perpetually devoted to the planting and growth of trees, plantations established on it being managed and protected under the direction of the conservation commissioner. The land would be exempt from State and county taxes, and for purposes of all other taxes would be assessed at not more than the price paid for it by the State or, if it was acquired by gift, at its valuation for forestation purposes, but not at more than the value fixed upon the town assessment rolls two years prior to the gift. The bill carries an appropriation of \$115,000, of which sum \$15,000 would be made available for the purchase of equipment for tree nurseries owned and operated by the State.

The second bill relates to the establishment of county forests. Under its provisions each board of county supervisors would be empowered to appropriate funds for the establishment of county forests, without giving public notice, and to raise money for this purpose by a tax on real and personal property. In each case in which the proposed forestation plan of a county and its prior expenditures for forestation purposes met with the approval of the conservation commissioner, an amount not to exceed \$5,000 a year would be contributed by the State toward the carrying out of the plan. In addition, the State would supply trees for planting. The plan might be either the purchase, forestation, and care of land suitable for the purposes of watershed protection, the production of timber and other forest products, and recreation and kindred purposes, or the forestation and care of land of this description already owned by the county.

The title to lands acquired under the provisions of this measure would be vested in the county, and the lands would be perpetually devoted to forestry purposes. The lands would be exempt from State and county taxes, and for the purpose of all other taxes would be assessed on the same basis as lands acquired by the State under the provisions of the bill just described.

The size of tracts purchased for county forests under the provisions of this bill would be limited to less than 500 acres, except in counties within the forest preserve.

Northern Wisconsin Counties Favor County Forests

In the fall election of 1928 voters of Langlade County, in northern Wisconsin, voted 2 to 1 in favor of establishing county forests. Through tax delinquency the county owns thousands of acres of cut-over land, much of which Extension Forester Wilson finds to be well stocked with valuable young growth. The entire county is included in the recently established State fire protection district No. 9. It was explained to the voters that if county forests were established they would probably be placed under the administration of the county agricultural agent, and that practically no expense would be incurred by the county in undertaking the project as contemplated other than the cost of placing signs at the boundaries of county forests in order to prevent trespassing.

Representatives of 16 northern Wisconsin counties met at Rhinelander in December to discuss the delinquent-land problem. This conference requested the legislature to amend existing law so that counties can get clear title under tax deed in less time than the six or more years now required, and so that counties can list their land without paying the tax of 10 cents an acre that is paid by private owners. It also requested that the legislature make forestry more attractive to private owners by reducing the tax from 10 cents to 5 cents, and that it enable counties to zone land for forestry and to discourage attempts at agricultural settlement within forestry zones.

Arkansas Forestry Bill Defeated

The Arkansas House of Representatives on February 18 rejected the bill proposed by Representative Ben E. McFerrin to create a State forestry commission, establish a State forest nursery, and provide penalties for negligently starting forest fires. The vote was 55 to 11. Mr. McFerrin has introduced a new bill lacking some of the controversial features of the defeated bill.

State Forester Proposed for Nevada

A bill introduced in the Nevada Legislature proposes the creation of the office of State forester. The only appropriation asked is \$200 to cover field and office expenses, the plan being to place the forestry duties with some State department already organized. The bill would authorize county commissioners to pass ordinances for the prevention of forest fire.

The standard of forest fire protection for the State of Minnesota, Michigan, and Wisconsin recently decided upon by the fire chiefs of those States is the limitation of each year's fires to one-fourth of 1 per cent of the total area under protection.

Timber Untouched by Fire Brings Better Prices

A 45-acre woodland at Sulligent, Ala., belonging to D. A. Eastman has been protected from fire for 41 years with negligible expense, the State forestry commission records. Eight years ago Mr. Eastman sold from the area practically all the timber more than 12 inches in diameter. Because the pine timber was almost entirely free from hollow butts, cat faces, pitch seams, heart rot, and other defects usually originating in fire wounds, the stumpage price per 1,000 feet was \$1.50 more than that of other pine cut in the locality. The oaks were hewed into crossties, and since almost every tree was sound the cutters averaged from one to three more ties per day than they had in any other woodland in the community. Another fairly good crop of timber could be cut from the land now.

More Fire Protection for Minnesota

Minnesota purchased 32 new lookout towers in 1928. Three construction crews were employed throughout the fall in erecting towers.

In each of two forest-protection districts of Minnesota a fire-fighting crew of eight men was kept on call during the six or eight weeks of greatest fire danger in 1928. Each man received a daily retainer of \$1 and was paid 35 cents an hour for time spent in fighting fires. A salaried man was kept on duty as driver of the fire truck. The system worked out so well that it appears to deserve extension to other districts. In one instance a crew assembled and started for a fire in 8 minutes.

New Forest Protective Association Organized in Connecticut

The Housatonic Forest Protective Association has been organized by owners of land in Norfolk, Canaan, Salisbury, Cornwall, and Sharon, Conn. Approximately 11,000 acres of land are to be protected by the new association, which is the sixth of its kind organized in the State. Together the six protective associations control more than 66,000 acres of privately owned woodland in western Connecticut. Members of the association assess themselves 4 cents per acre per year and the State matches the members' contributions. Hon. John Calhoun, of Cornwall, has been elected chairman of the new association, and A. W. Krause, Canaan, is its secretary and treasurer. A. W. Brooks, Torrington, has been employed as patrolman.

The tenth steel observation tower of the Connecticut Department of Forestry was recently completed in the town of Oxford.

California Fire Record for 1928

Careless smokers were held responsible for about half the 2,660 fires reported in 1928 on areas of California patrolled by the State government. After the 1,160 fires traced directly to this cause the next largest group was the 401 traced to brush burners. The remainder of the list given out by State Forester Pratt is: Incendiary, 362; railroads, 103; lumbering, 100; campers, 83; lightning, 66; miscellaneous and unclassified, 385.

Charges brought by representatives of the forestry board and cooperating agencies resulted during the year in 233 convictions of violation of the State fire laws, and 53 cases were settled out of court. Penalties imposed included 31 jail sentences and fines amounting to \$5,048.50.

Three New Protection Districts in Wisconsin

The establishment of 3 new forest-protection districts in Wisconsin in 1928 brought the total number of such districts to 11. The protection system now covers substantially all parts of the State that are thought to need protection. Each district has a headquarters building that is a combined office and storehouse.

Out of an estimated requirement of from 100 to 125 fire towers Wisconsin now has 75, of which 21 were built in 1928. All the towers erected in that year have glass-enclosed tops.

Four forest-protection units were organized by the Texas Forest Service in 1928 in cooperation with the Houston County Timber Co., the Southern Pine Lumber Co., the Temple Lumber Co., and the Gilmer Co. Together they embrace 395,000 acres of company land.

The number of lumbering fires in Texas was 28 per cent less in 1928 than in 1927.

A special forestry division has been established by the Alabama Commission of Forestry, comprising the counties of Mobile, Baldwin, and Escambia. Forest Inspector Harry F. Smith, formerly stationed at Union Springs, was assigned to the new division. In cooperation with local forestry agents and patrolmen Inspector Smith will make a survey of the section with the view of determining how its heavy losses from forest fires may be reduced.

Seven 80-foot steel lookout towers were erected in 1928 by the Pennsylvania Department of Forests and Waters.

Classification of Minnesota State Lands

Setting aside of 541,048 acres of State land in 53 townships in northern Minnesota as State forests is recommended by Commissioner of Forestry and Fire Prevention G. M. Conzet in a report to the legislature on "State Lands, Their Agricultural and Forest Possibilities." State forests already established in Minnesota contain 388,000 acres. This report is the result of a classification of State lands carried out by the commissioner in accordance with a measure passed by the legislature in 1927. Other recommendations contained in the report call for the consolidation of State forest lands by acquisition or exchange; more intensive fire protection for these lands; the adoption of a planting program and the establishment of a State nursery; provision for research, timber sales, and management plans; an economic survey and land classification; and the payment by the State of a tax on lands set aside as State forests.

Not all of the 541,048 acres recommended for State forests is classified as permanent forest land. Out of 311,408 acres examined 13,200 acres is classed as suitable for agriculture but not needed for farming at present; and 98,909 acres is classified as submarginal even for timber production. The latter total includes natural grass meadows, open muskeg, barren highland, and areas that support only a dwarfed, stagnant growth of trees. Most of these nonproductive areas have a value for game production or as natural water reservoirs and for that reason are recommended for inclusion in State forests.

Little of the State land examined has been burned over, largely because of the great proportion of swamp and the fact that most of the highlands are islands surrounded by swamp.

Out of 212,499 acres of timber-producing land examined 43 per cent is virgin and 57 per cent has been cut over. On some of the cut-over land there is merchantable timber (second growth or trees reserved by the State when the area was logged); on most of it, however, reproduction is not satisfactory either in density or in species. Although the State timber is scattered and much of it is slow growing, it is generally in good condition and is not deteriorating, so that there is no hurry to dispose of it.

The survey brought out the fact that the State owns a good deal of land poor for agriculture and unsuited even for timber growing. The estimates of timber stand are lower than any previous estimates of timber on Minnesota State lands. The report advocates the acquisition by the State of good forest land to offset its poor land.

The total area of State land in Minnesota is 1,943,235 acres. If the estimate resulting from this study, that the timber stand on the lands examined averages 924 board feet per acre, is applicable to the total area

of the State's lands, the standing timber on State lands aggregates about 1,795,549,000 board feet.

As a result of the survey, maps were prepared showing the economic status of land, timber types, and surface indications of soil conditions in five groups of townships in which examinations were made. Two preliminary management plans were also prepared.

Two Timbered Tracts Purchased by Illinois

By a recent purchase, two timbered tracts in Alexander County, Ill., became the property of the State. One of these is included in the 3,000 acres of land and water at Horseshoe Lake, near Olive Branch, which the State will develop as a game and fish preserve. About 300 acres of the Horseshoe Lake property is in forest, containing some excellent timber. The second area included in the purchase is a 400-acre tract of hilly timberland about 6 or 8 miles north of Horseshoe Lake. This property has been pretty thoroughly cut over in recent years and has suffered at various times both from trespassing and from fire. Still it contains some merchantable timber and on the whole is well stocked with young trees, including some oaks, red and black gum, yellow poplar, maple, and beech. The game commission intends to use this tract for game purposes, perhaps for experiments in raising quail. In the meanwhile Chief Forester Miller has taken steps to protect it from fire and to demonstrate firebreak construction to the owners of the neighboring property, most of which is forest land. A fire line nearly four furrows wide has been formed around the property with the use of a tractor and a heavy breaking plow. The fire line has been built to follow the main ridges surrounding the watershed of a stream that drains the property, although at several points this meant carrying it outside the property line. The cost for labor and supervision was about \$112. It is planned to arrange for a local resident to act as guard during the fire season, remunerating him with the use of the 75 acres or so of cleared land included in the tract and with a small monthly fee.

Essex County, N. Y., Acquires its Second Forest

Essex County, N. Y., has acquired another county forest by purchasing 516½ acres of the John E. Millholland estate in the town of Lewis. This land is located about 3 miles north of Elizabethtown at the junction of the main highway to Montreal and the road to Lake Champlain. It lies in what the State conservation department classes as the best white-pine territory in New York. Planting will be begun this year, with the expectation that it will be completed in 1930.

Cook Forest in Pennsylvania Becomes Property of the State

The Cook Forest, in Forest, Clarion, and Jefferson Counties, Pa., has become the property of the State, Pennsylvania citizens having subscribed the \$200,000 needed to complement the \$450,000 appropriated for its purchase by the legislature. This forest of 7,219 acres contains more than 500 acres of old-growth timber, the largest existing remnant of the original forests of the State. It is to be used as a State forest park.

Blister Rust Control Work in New Hampshire

Although spring came late last year and the early summer season was unusually rainy, New Hampshire blister rust control forces contrived to cover even more ground in 1928 than in 1927. Initial work in the eradication of *Ribes* was carried out on 145,329 acres of land, and reexamination on 82,201 acres. Toward the cost of this work \$26,300 was made available by 75 towns; \$2,400 by 4 cities; and nearly \$6,000 by 37 individuals, associations, and lumber companies. The cost per acre averaged 17.8 cents.

Better Fire Record for Louisiana Protected Area

Ninety-nine out of every hundred acres protected by the Louisiana Division of Forestry escaped burning in the 6-month period ending December 31, 1928, which was the most successful half year thus far recorded by the division. On similar lands in the State not under protection fires covered from 10 to 50 acres in each 100, State Forester Hine reports. For the protected area the total number of fires was 795 and the total area burned was 47,859 acres.

Two steel observation towers were erected in Maryland in 1928, one 93 feet high at Brandywine, Prince George County, and one 120 feet high at Millville, Worcester County.

During 1928 Ohio purchased 4,426 acres of forest land, 3,930 acres for State forest and 496 acres for State forest park purposes. The average cost per acre was \$8.10.

An increase of 899 acres in the area of State forest land in New Jersey between October 1, 1928, and January 1, 1929, brought the total to 25,956 acres.

Higgins Lake Nursery Furnishes 12,000 Young Trees

Trees taken from the Higgins Lake nursery of the Michigan Department of Conservation in 1928 totaled 12,894,400. Of this number 11,626,600 were planted on the State forests and 1,267,800 were distributed to private planters. The acreage planted was 14,295, distributed as follows: State forests, 13,027; other State lands, 148; municipalities, 95; water and power companies, 112; organizations, associations, and clubs, 73; farmers, 420; others, 420.

The trees were white, Norway, and jack pine, which are the only species raised in this nursery.

Idaho Guide for Tree Planters

A convenient 2-page guide for tree planters was issued last fall by the School of Forestry, University of Idaho, in connection with its announcement as to the planting stock available for distribution from the State forest nursery. One table classifies the 29 available species according to drought resistance, requirement of special care, and desirability for farm woodland, shelter belt or windbreak, ornamental, roadside, or shade purposes, and a second table indicates for each of the 44 counties of the State which of the species are best adapted to local conditions.

The 1928 crop of the Alabama State forest nursery was distributed to 216 landowners in 31 counties. This distribution reached 14 more counties than that of the preceding year. Longleaf pine was by far the most popular species, with black walnut and catalpa next in rank.

Several pounds of persimmon and ash seed from Wake and other counties in the eastern part of North Carolina have been forwarded by State Forester Holmes to Russia for experimental planting, at the request of the forester of Torgavitz, Uman County, Russia.

Four additional tracts in North Carolina have been authorized by the State board of conservation and development as game refuges and auxiliaries. One of 1,000 acres is a part of the Fort Bragg Military Reservation, and one of equal size is included in the property of the Tallahassee Power Co. Others are situated in Vance Township, Lenoir County, and on holdings of the University of Chicago in Carteret County. Game reserves under the administration of the State now number 12.

Education and Extension

Pack Gives Yale \$200,000 for Applied Forestry Studies

A foundation for the advancement of applied forestry has been established at Yale University, through a gift of more than \$200,000 by Charles Lathrop Pack. The purpose of this endowment is to advance the knowledge and practice of forestry in the United States through field investigations and experiments and through the development of examples of applied forestry.

The first piece of work to be financed by this foundation will be a study conducted by Henry S. Graves, dean of the Yale Forest School, to determine how an educational institution like Yale may contribute to the progress of forestry through experimental and demonstration forests and in other ways.

Yale owns or controls a number of forest tracts in Connecticut and New Hampshire that are being used for instruction and research and for the demonstration of forestry practice. These forests, Dean Graves points out, are well adapted to the work contemplated in establishing the Charles Lathrop Pack Forestry Foundation, and will be greatly enhanced in value by this work.

A previous gift by Mr. Pack enabled Yale to enlarge its forest property at Keene, N. H. In past years, also, Mr. Pack has given funds for the establishment of demonstration forests to the New York State College of Forestry and the College of Forestry of the University of Washington.

National Research Fellowships in Agriculture and Forestry

A number of fellowships in the fields of agriculture and forestry are being established by the Board of National Research Fellowships in the Biological Sciences. The fellowships are intended not for the support of work in the more specifically applied phases of agriculture and forestry but for the development of men planning to work in the fundamental aspects of these subjects. They are intended primarily for relatively recent graduates and not for those already professionally established, and are open to citizens of both sexes of the United States and Canada who possess a Ph. D. degree or its equivalent. The appointments are for full time, and fellows are not permitted to engage in any other remunerative or

routine work. The choice of a place to work is left to the fellow, subject to the approval of the fellowship board.

The basic annual stipends are \$1,800 for unmarried fellows and \$2,300 for married fellows in America, or \$1,440 and \$2,184, respectively, with additional travel allowance for fellows appointed to study in Europe. Awards are made for one year, but fellowships may be renewed.

It was asked that persons wishing to be considered for appointment to these fellowships for 1929-30 file their applications with the Board of National Research Fellowships in the Biological Sciences at the headquarters of the National Research Council in Washington, D. C., by April 1. The final choice of fellows is to be made by the board at a meeting on April 25-26.

Three Cornell Fellowships—Nature Education, Forestry, and Diseases of Ornamentals

Through a gift of the Charles Lathrop Pack Forestry Trust, Cornell University is enabled to spend \$3,000 a year in each of the two school years 1928-29 and 1929-30 in maintaining two or more fellows studying problems of nature education and forestry. The purpose of the investigations is to determine methods and practices affecting the education of the public in the use of natural resources.

The Armstrong fellowship, established in Cornell by the Armstrong Tree Service (Ltd.) for a period of two years beginning June 1, 1928, carries an annual grant of \$1,250 and has as its purpose the investigation of diseases of shade and ornamental trees.

Woodsmen's Short Course Repeated by Wisconsin

The woodsmen's short course given by the University of Wisconsin in the fall of 1927 has been repeated in the present school year, with principal emphasis on commercial planting. Field instruction was given on the land of the Nekoosa-Edwards Paper Co., where commercial planting by means of tractors was demonstrated. Among the students were several logging superintendents of companies planning to undertake selective logging.

Forestry Course at North Carolina Agricultural College

The North Carolina State College of Agriculture and Engineering, Raleigh, N. C., is organizing a division of forestry headed by J. V. Hofmann, formerly professor of forestry at the Pennsylvania State Forest School. One general course in forestry was offered for the second half of the present school year. The school has a forest of about 1,500 acres near Raleigh, including one piece of untouched shortleaf pine and oak.

Agricultural College Supplies Planting Stock for Northern Michigan

At the Dunbar Experiment Station, near Sault Ste. Marie, the Michigan Agricultural College has been developing a forest nursery, beginning in 1926. A million seedlings are now on hand, which will be used to supply planters in the upper peninsula and in the extreme northern part of the lower peninsula. The Dunbar station comprises 570 acres, nearly all wooded. It is being used by Professor Chittenden, head of the forestry department of the college, for field work as well as for silvicultural experiments.

Occupations of California Forestry Graduates

Of the 127 graduates of the University of California classed by the university's forestry alumni society as foresters (this number includes 14 men who did not major in forestry and 1 deceased) only 32 are now engaged in work unrelated to forestry. More than one-fourth of the total are employed by the United States Forest Service, 25 in forestry and 9 in grazing work. Other public employ is reported for 12 of the men engaged in forestry or related work, private employ for 9, and teaching for 4. Lumbering has claimed 28 of the group, entomology and pathology 6. There are 2 engaged in grazing work outside the Federal service.

Master's degrees have been won by 34 of the men and a Ph. D. by 1. Of the master's degrees 26 were conferred by the University of California.

Nearly two-thirds of the group, 81 men, are living in California; 36 are elsewhere in the United States and Alaska; and 9 are in foreign countries.

California Ph. D. in Forestry

The forestry department of the University of California now has equal status with all other departments of the university in respect to opportunity for work toward the Ph. D. degree. A recent decision of the academic senate of the university removes restrictions as to the departments in which the work of a candidate for the degree may be centered.

First Sophomore Forestry Camp of the University of Michigan

The first sophomore summer camp of the School of Forestry and Conservation, University of Michigan, will open on June 24 in temporary quarters at a lumber camp of the Cleveland-Cliffs Iron Co. in Alger County, Mich., about 10 miles west of Munising. Robert Craig, jr., will direct the camp and Shirley W. Allen will be an instructor. The students will measure logs, individual trees, and stands of timber, will study growth and yield, and will have practice in fire prevention and suppression and in the construction of forest improvements. The location of the camp will permit frequent excursions to woodworking industries. Near the camp site are stands of virgin timber and logging operations. The students will be in the woods until the middle of August.

Half of Cornell's Forestry Graduates Stick to Forestry

Half the men holding forestry degrees conferred by Cornell University in the period 1911-1928, inclusive, have remained in the forestry profession, according to a survey made by Prof. C. H. Guise. In September, 1928, Professor Guise found, 112 of the university's 222 living forestry graduates were engaged in forestry. Of these practicing foresters 58, or more than half, were in private employ; 27 were in Federal and 10 in State employ; 7 were teaching; 6 were engaged in graduate study; and 4 were abroad. Out of 54 men who had received the M. F. degree from Cornell, 39 were still in forestry. The latter group included 14 in private and 18 in Federal and State employ, 4 teachers, and 3 men in foreign countries.

Men specializing in forestry made up only half the total number of students—246—who registered for regular forestry courses at Cornell University in the year 1927-28. For that year, also, the forestry department reports 19 registrations in the summer school by men who were not candidates for forestry degrees, 28 in the summer camp, and 6 in the short winter course.

Idaho Puts on Forestry Education Campaign

A forestry educational campaign was made in Idaho last summer by the State chamber of commerce, the forestry associations, and the State board of publicity in cooperation with the United States Forest Service. Four reels of film were specially prepared. The Forest Service provided a truck outfitted with motion-picture apparatus, and a man to drive the truck and operate the projection machine. The cooperators provided as lecturer State Senator John D. Robertson. In the 76 towns where meetings were held the attendance averaged 435. The tour was given favorable notice by 58 newspapers in the State.

Education for Fire Prevention Pays

The forest-protection dollar goes much farther when a good proportion of it is spent in educating the public to prevent fires, according to the results of the fire-prevention experiment recently concluded on Cape Cod. In the six townships that were the scene of the experiment the total cost of forest-fire suppression in the 3-year period ending with 1925 was \$29,487; during the three years of the experiment, 1926-1928, activities for public education, patrol by fire-prevention agents, and suppression all together cost but \$23,551, or 20 per cent less. For the three years preceding the experiment the total area burned over was 28,089 acres; for the period of the experiment it was 5,885 acres, a reduction of 79 per cent. In other words, with the use of one-fifth less money the fire losses were reduced by four-fifths.

Boy Scouts "Know Their Stuff" and Practice It

The council for the southeast district of New Mexico, Boy Scouts of America, has been given permission to maintain a scout camp in Potato Canyon, Lincoln National Forest. To make the camp accessible a road approximately 4 miles in length has been built. This road is of particular value to the Government in that it gives access to an area of relatively high fire risk. Cabins to accommodate 300 boys have been built, with mess hall, assembly hall, workshop, office, and hospital. The boys are given instruction in hygiene, and during the past year in camp they have had no use for the last-mentioned building except as a guest house. The boys have built 4 miles of telephone line.

Ranger R. I. Boone, in charge of the Weed Ranger District, gives the boys training in the prevention, detection, and suppression of forest fires. The boys now propose to build a lookout tower on Potato Peak and man it during their stay in the woods.

Ranger Boone says:

With 300 boys in the woods during the past fire season not a single forest fire was started. Some of the boys went on a hike of several days to the Sacramento River, cooking their meals on open fires, but every fire was taken care of before they left it. Turn 300 men loose in the woods and get gray. The boys know their stuff and practice it.

Texas Reports Successful Fire Prevention Campaign

In 1928 a motion-picture operator and lecturer employed by the Texas Forest Service served continuously from June till the end of the year, giving 165 shows before a total attendance of 23,710 people in the forest fire protection area. The field force of the service posted 23,642 fire-warning notices. Forest patrolmen made 982 school visits, giving talks to 58,422 pupils. More than 86,000 pieces of printed matter

on forest-fire prevention were distributed to children and adults, and 19,646 adults were interviewed regarding care with fire in the woods.

For 1928 the Texas forestry organization reports a gain of 61 per cent over 1927 in the number of farmers, stockmen, and others, not including railroad or lumber employees, who voluntarily gave assistance in fighting forest fires.

Tree Planting Campaign at Dallas, Tex.

Prizes totaling \$175 were offered in a tree-planting campaign conducted in Dallas, Tex., this winter under the auspices of the civic art committee of the city plan commission of Dallas. Miss Jeannette K. Rippe won \$25 offered for the best slogan to be used during the campaign, with the slogan—

Plant trees to-day—
Inherit beauty to-morrow.

First and second prizes of \$50 and \$25, respectively, were offered to the parent-teacher associations bringing about the planting of the largest numbers of shade trees; a prize of \$25 to the child obtaining the largest number of orders for trees; and first, second, and third prizes of \$25, \$15, and \$10 to organizations for window displays in Oak Cliff showing the importance of tree planting.

Pupils in Rural Schools Plant Black Walnut

A project undertaken by children in rural schools of Rowan County, N. C., under the supervision of County Agent Yeager, calls for the planting of a black walnut grove on each of the farms from which the children come. Many schools in the county have already made a 100 per cent report. In addition, the children are collecting the best black walnuts they can find and entering them in exhibits at each local school. Selections from these exhibits will be entered in a county-wide show, and the nuts finally selected as best will be used in planting black walnut trees as a Four-H Club project on each of the 60 or more rural school grounds in the county.

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The Mississippi Forest Service last fall sent every public school superintendent and principal in the State an outline of suggested correlations between forest study and nature study, geography, agriculture, community civics, science of home and community, biology, elementary economics, and English. The folder presenting this outline gave also a list of material suitable for use in making these correlations that could be obtained from the State forester and the United States Forest Service. The folder was perforated so that the list of material could conveniently be detached for mailing when the teacher had checked the items desired.

Louisiana Schools Plant More Trees on Arbor Day

The steadily growing popularity of Arbor Day in Louisiana was demonstrated this year by orders from schools for more than 15,000 State nursery trees. This was twice as many trees as the nursery had ever before provided for Arbor Day plantings. The largest shipments were made to schools in and around Lafayette, St. Martinsville, Breaux Bridge, and New Iberia. Much wild stock, as well as the stock from the nursery, was planted by schools on Arbor Day, which was celebrated on February 8; and thousands of trees in addition to those for Arbor Day planting were supplied by the State forester for school forest planting during the recent season.

Forestry Lectures and Motion Picture Shows Given Before Thousands in the South

By the end of 1928, 900 lectures and motion-picture showings had been given in schools of Florida, Georgia, and Mississippi by the staff of the forestry educational project in which the governments of those States are cooperating with the American Forestry Association. The audiences at the school meetings totaled 120,000, and included 70,000 school children. In addition 10,000 people were reached through programs given at county fairs. The five trucks that carry the lecturers and their motion-picture outfits and exhibits from place to place have an average mileage of 1,000 per month.

Texas Boy Wins Trip to the Four-H Club Congress by Forestry Work

Fourteen-year-old Charles Jameson, of Tatum, Tex., won a free trip to the National Four-H Club Congress in Chicago in December, 1928, by his successful management of an acre of poor-quality farm woodland. The trip was paid for by the East Texas Chamber of Commerce. The acre of his father's farm on which Charles worked has pine, all under 6 inches in diameter, growing on about half of it and persimmon trees below merchantable size on one-quarter. The remaining quarter is without tree growth. The boy has built fire lines, carried out measures to protect the trees from insects and diseases, made improvement cuttings, collected forest-tree seed for sale and planting, and planted and cared for a small forest nursery from which he made an exhibit at the county fair. In 1928 wages for himself at 30 cents an hour, 25 cents an hour for the use of a horse, and taxes amounted to \$8.62, and the value of the products, chiefly firewood, amounted to \$11.20. An additional \$1.20 was credited to his account from the pasturage of livestock. The nursery cost him \$1.52, but the value of the trees in it is just about equal to that sum. Next year these trees are to be used in reforesting the barren part of the acre.



A farmer in Richland County, Ohio, recently sold 86 white ash trees for \$850 on the stump to a buyer who had offered him \$300 for them before they were estimated by Extension Forester Dean and County Agent Gilkey. The volume of the trees was estimated at 26,000 feet.

Forest Service Notes

Forest Service Appropriations for the Fiscal Year 1930

The new agricultural appropriation act provides \$13,024,280 for the support of Forest Service activities, exclusive of road and trail construction and maintenance, in the year ending June 30, 1930. This represents an increase of \$480,212 over the amount allowed for this purpose in the present fiscal year, aside from salary increases under the Welch Act.

An increase of \$189,098 over the current appropriation for forest fire protection work in cooperation with the States and for the study of forest taxation and timber insurance brings the 1930 fund for those purposes to \$1,400,000. An increase of \$56,088 will make \$645,000 available for improvements on the national forests. Appropriations of \$585,000 for forest products research, \$413,000 for silvicultural investigations, and

\$67,000 for range investigations represent increases of \$42,404, \$35,593, and \$14,320, respectively, over the amounts currently available for work in these fields. The administrative organization outside Washington receives an increase of \$75,714, bringing its total allowance for salaries and expenses to \$6,703,000; the sanitation and fire prevention fund, which is used for the construction of national forest camp-ground improvements, grows by \$10,000, becoming \$50,000; and cooperation with the States in the distribution of forest planting stock wins an increase of \$7,520 that makes the total appropriation for this purpose \$83,000.

The appropriation for the purchase of additional lands for national forests remains at \$2,000,000.

Two new projects authorized by the McSweeney-McNary Act, a national survey of the timber situation and a study of the cost and returns of timber growing, are to be launched in the coming fiscal year with appropriations of \$40,000 and \$25,000, respectively.

Large National Forest Purchase Program Approved

One of the largest programs ever submitted to the National Forest Reservation Commission was approved by the commission on February 21. The commission approved for purchase 234,920 acres of land representing an obligation of \$944,000. Among the 149 cases covered by this authorization are 27,067 acres in Pennsylvania, including the Heart's Content area, which will become an addition to the Allegheny National Forest; 49,631 acres in the Ozark National Forest, Ark., most of which was offered by the Missouri-Pacific Railroad Co.; 47,602 acres in the Ouachita purchase unit, Arkansas; 25,198 acres in the Kisatchie and 11,230 acres in the Catahoula unit in Louisiana, which will be the first land purchased in that State for national forest purposes; a first purchase of 34,010 acres in the Keweenaw unit, in Michigan; and 10,618 acres in the Marquette unit, Michigan. The 10 smaller purchases comprise 29,564 acres in Minnesota, Michigan, Alabama, Georgia, South Carolina, North Carolina, Virginia, West Virginia, Tennessee, and New Hampshire.

The commission approved as national forest purchase units, under the provisions of the Weeks law, the private lands within the Choctawhatchee and Ocala National Forests, Fla., and a third area in Florida to be known as the Osceola.

More Evidence Against Broadcast Burning

In northern Idaho, a logged area on which enough trees have been left to form half the normal forest canopy is usually safe from spread of fire one or two days longer after each good summer rain than a similar area that has no shade, according to the results of a 4-year study by H. T. Gisborne of the Northern Rocky Mountain Forest Experiment Station. The higher degrees of inflammability, likewise, do not occur in ground fuels under half shade for one or two days after they occur in fuels that have no shade whatever. Apparently the presence of a half canopy lengthens the periods of safety by about 9 per cent and decreases the periods of great danger in like proportion. During the 1928 fire season, maximum temperature in the duff on the fully exposed area studied averaged 7° higher than that under a half canopy.

This result of shading argues in favor of piling and burning and against broadcast burning as a method of disposing of logging slash in the northern Rocky Mountains. The latter method in killing most of the residual stand, as it usually does, not only eliminates the potential value of the remaining trees in themselves and as a shelter for reproduction but intensifies the difficulty of protecting the logged area from later fires. Incidentally, the more moist conditions maintained in

ground fuels under partial shade cause more rapid decay of the fuels, and in this way, also, reduce the probable cost of fire protection and the probable losses in case of fire.

Wilderness Areas on the National Forests in California

Without pretending that the national forests in California include 1,500,000 acres of actual wilderness, the Forest Service is planning to preserve primitive conditions on about that much of their area. Chiefly in order to protect recreational values, 14 separate tracts embracing parts of 15 of the forests have been designated to remain in a state close to that of wild land. These areas will not be developed by road building or opened to any form of permanent recreational occupancy under permit. In general, they are located in the higher mountain regions where the fire hazard is not great and where roads are not needed for forest administrative purposes. Much of the land will be subjected to grazing, and on some of it there may be some timber cutting or waterpower development in years to come.

The areas and their locations are as follows:

Middle Eel-Yolla Bolla: More than 200,000 acres around Yolla Bolla Mountain and at the head of Middle Eel River on the California and Trinity Forests.

Agua Tibia: 27,000 acres on the west end of Palomar Mountain on the Cleveland Forest.

Desolation Valley: Some 41,000 acres north of Echo Lake and west of Lake Tahoe on the Eldorado Forest.

Salmon-Trinity Alps: About 130,000 acres at the headwaters of Trinity and Salmon Rivers on the Klamath, Shasta, and Trinity Forests.

South Warners: 75,000 acres around Eagle Peak in the South Warner Mountains on the Modoc Forest.

Hoover: 23,000 acres west of Mono Lake on the Mono Forest, named after the former superintendent of the Bodie mines.

Dana-Minarettes: 87,000 acres lying between Tioga Pass and the Devil Post Pile country on the Mono and Sierra Forests.

Murphy Hill: About 12,000 acres surrounding Campbell, Morris, and Lotts Lakes west of Belden on the Plumas Forest.

San Gorgonio: About 19,000 acres covering the San Bernardino and San Gorgonio range on the San Bernardino Forest.

Telegraph Peak: 7,500 acres around Telegraph Peak on the San Bernardino Forest.

San Jacinto: About 22,000 acres covering the high country east of Idyllwild and Keen Camp on the San Bernardino Forest.

Ventana: Some 52,000 acres of wild mountain land at the north end of the Monterey division of the Santa Barbara Forest.

Emigrant Basin: 98,000 acres on the Stanislaus Forest lying between Kennedy Meadows and the north boundary of Yosemite National Park.

High Sierra: About 700,000 acres including most of the High Sierra crest on the Inyo, Sequoia, and Sierra Forests, from Mount Whitney on the south to the Mammoth Lakes region on the north, a 75-mile stretch of wild, rugged mountains.

Western Yellow Pine Seed Outlive Long Storage Without Special Treatment

Western yellow pine seed may remain viable for a long succession of years even without careful storage, according to the results of recent tests at the Southwestern Forest Experiment Station, Flagstaff, Ariz. On the basis of these results western yellow pine would seem to rank with jack pine and lodgepole pine in this respect, although unlike these species it does not give a sign of the persistent vitality of its seed by retaining its cones for many years.

Tests were made in 1928 on seed of many coniferous species, from different sources, that had been accumulating at the station since 1909. The seed had in all cases been placed in either cardboard tubes or cloth sacks and stored on shelves in the greenhouse workshop. In this workshop, which adjoins the greenhouse, the temperature ranges in the course of a year as high as 80° F. and as low as 10° F. Throughout the year the shop is well ventilated and is kept dry.

Seed collected in 1913 from western yellow pines growing on the Colorado Plateau, the region in which the experiment station is located, in 1928 showed a viability of 61 per cent. At the time when this sample was collected, a test showed it 82 per cent viable; thus during 15 years' storage its annual loss of viability appears to have averaged only 1.4 per cent. Less favorable results were obtained with native western yellow pine seed collected in 1909 that manifested relatively poor germinative quality at the start; having shown 51 per cent viability at the time when it was collected, after 19 years' storage this sample showed a viable proportion of only 9 per cent. A third lot, collected in 1917, showed only 59 per cent viability after 11 years' storage. For this sample no original test records were available, but from the results of a test made on other native western yellow pine seed collected in the same year it appeared that the crop of that year had relatively low viability.

Ten samples of western yellow pine seed collected in 1912 on as many different forests not on the Colorado Plateau showed in 1928 an average germination percentage of only 2.

A sample of Engelmann spruce seed collected on the San Francisco Peaks in 1925 showed a viability of 43 per cent at Flagstaff in 1928; another collected in the same locality in 1927 and stored at Flagstaff for 11 years failed to germinate.

Apache pine (*Pinus apachea*) collected in 1912 on the Chiricahua National Forest (now the Coronado National Forest), Ariz., germinated in the proportion of 51 per cent before storage and in that of 20 per cent at the end of 16 years.

Some imported seed collected in 1910, including European larch, Norway spruce, and Scotch pine, were tested but failed to germinate.

Results of Thinning Jack Pine Plantations in Nebraska

Early results from the first experimental thinning of Jack pine (*Pinus banksiana*) plantations established on the Nebraska National Forest in 1911 indicate that diameter growth is stimulated directly as the space between trees is increased, at least until the density of the stand is reduced to 700 trees per acre. Some plots have shown a slight stimulation of height growth after thinning. One plot was thinned and measured in December, 1920, and a group of three plots were thinned with varying degrees of severity and measured in March, 1923. The first remeasurement of these thinned plots and of adjacent unthinned plots was made late in 1926.

Stagnation has not as yet become a serious factor in the unthinned plots, which originally averaged about 2,400 trees per acre. For this reason and also because of lack of information on the rate of growth of larger trees, on the productive capacity of the soil, and on the kind of crop that may most profitably be grown and marketed, a prediction of the future yield of these plantations on the Nebraska sand hills is not justified. At the present rate of diameter growth as shown by the measurements a plantation thinned to a density of 700 trees per acre 10 years after it is established will produce 8-inch diameters in 20 years, and one thinned at that time to a density of 1,500 to 1,600 trees per acre will produce 8-inch diameters in approximately 30 years.

From the standpoint of diameter increment, Assistant Silviculturist Jacob Roeser concludes after a study of the data at hand, a very heavy thinning is most desirable; from the standpoint of protecting the soil and of providing against possible losses in the stand, however, it appears that it is desirable to leave about 900 trees per acre 10 years after planting.

Volume of Solid Wood in a Cord of Maple

Measurements made by foresters of the Lake States Forest Experiment Station on hard maple cordwood cut near Ruse, Mich., showed that a standard cord made up of round sticks of different diameters contained, on the average, the equivalent of 80 cubic feet of solid wood if the bark had not been removed from the sticks and the equivalent of 65 cubic feet of solid wood if the bark had been removed. The average content of a single cord made up of round sticks having a middle diameter of 5 inches was found to be 50 cubic feet if the bark had been left on the sticks, and 39 cubic feet if the bark had been removed. The corresponding figures for a cord made up of round sticks with a middle diameter of 20 inches were 88 cubic feet and 73 cubic feet.

Frost Retards Growth of Planted Redwood in Oregon and Washington

Shortleaf and Loblolly Pine Litter and Humus a Valuable Fertilizer

By W. R. MATTOON, United States Forest Service

The early fortunes of 17 plots of redwood trees planted by the United States Forest Service in western Oregon and Washington indicate that the redwood is too susceptible to frost injury to do well in this region except at low elevations. Because of the tree's rapid growth and its ability to coppice, foresters and timberland owners in the Pacific Northwest have taken considerable interest in the possibility of introducing it there. The natural range of the species has its northern limit in the extreme southwestern corner of Oregon, only a few miles from the California line.

In plantings made at elevations of from 750 to 3,000 feet in the Coast Range and the Cascade Mountains, many of the trees were killed outright by frost and others have been frozen back repeatedly with the result that they are but little taller now than when they were planted, although all but one of these plantings were made in 1924.

In 2 plantings made on shallow rocky soil and 1 on an area of almost pure sand, mortality was complete. On 1 plot cattle grazing interfered with the reliability of the test. Of the remaining 13 plots one had a survival percentage of 12 and the others showed survivals ranging from 44 to 72 per cent. It is pretty clearly established that fair survival may be obtained with plantings at low elevations in the coast region; whether the surviving trees will make normal growth appears, however, to be very questionable.

Indications are that growth of young redwoods is greatly retarded by the dense cover of herbaceous vegetation common in most areas of western Oregon and Washington. The best growth made by any of the plots took place in Mount Hebo—the furthest north of all the experimental planting sites—where the trees were planted in the open at the base of a new highway grade.

Training Camp of the Southwestern National Forest District

To give practical training to new employees in the fundamentals of their work and to keep men older in the service up to date in methods of forest fire protection and of forest and range management the Southwestern National Forest District has for five years held an annual training camp. The training camp held in 1928 offered a 3-week course both to the junior and to the more advanced class. The instructors included, together with Forest Service men, local representatives of the Bureau of Biological Survey and the Bureau of Plant Industry. Men of the National Park Service and the Arizona Extension Service were admitted as students. With only one exception all the forest supervisors, deputies, rangers, and assistant rangers in the district have attended one or another of the five annual camps.

Analysis has been made by the Bureau of Chemistry and Soils of samples of leaf litter and humus which I collected from the forest floor in three pure second-growth stands of shortleaf and loblolly pine in North Carolina. In these stands the trees were from 30 to 40 years old and there had been no fire for 20 years, perhaps never.

In each of the three stands from which samples were taken the layer of dry organic matter on the forest floor was of about the same depth and weight. It averaged about 3 inches in thickness, and in weight about 1 pound per square foot. (In addition, there was about 1 pound of siliceous matter, or mineral soil, per square foot.) Allowing one-fourth of the area for tree trunks and bushes, I estimate that there were not less than 16 tons of organic litter on an acre. If this estimate is correct, according to the results of the chemical analysis the litter on 1 acre of the unburned shortleaf pine woods contains 202 pounds of nitrogen, 77 pounds of potash, and 41 pounds of phosphoric acid. At wholesale commercial prices this material is worth \$42.88. For the lowland and upland loblolly pine woods the corresponding values are \$38.08 and \$41.60, respectively.

The proportion of the weight of the litter and humus that was found to be formed by nitrogen, potash, and phosphoric acid, respectively, is given in the following tabulation, together with figures indicating the wholesale commercial value of these constituents as fertilizer:

SHORTLEAF PINE WOODS (UPLAND)

	Per cent of weight	Pounds per ton of litter	Value per pound	Value per ton of litter	Value per acre
Nitrogen (NH ₄) (ammonia).....	0.631	12.6	\$0.18	\$2.27	\$36.32
Potash (K ₂ O).....	0.240	4.8	0.06	0.29	4.64
Phosphoric acid (P ₂ O ₅).....	0.127	2.5	0.05	0.12	1.92
Total.....				2.68	42.88

LOBLOLLY PINE WOODS (LOWLAND)

	Per cent of weight	Pounds per ton of litter	Value per pound	Value per ton of litter	Value per acre
Nitrogen (NH ₄) (ammonia).....	0.578	11.5	\$0.18	\$2.07	\$33.12
Potash (K ₂ O).....	0.171	3.4	0.06	0.20	3.20
Phosphoric acid (P ₂ O ₅).....	0.112	2.2	0.05	0.11	1.76
Total.....				2.38	38.08

LOBLOLLY PINE WOODS (UPLAND)

	Per cent of weight	Pounds per ton of litter	Value per pound	Value per ton of litter	Value per acre
Nitrogen (NH ₄) (ammonia).....	0.612	12.2	\$0.18	\$2.20	\$35.20
Potash (K ₂ O).....	0.178	3.5	0.06	0.21	3.36
Phosphoric acid (P ₂ O ₅).....	0.190	3.8	0.05	0.19	3.04
Total.....				2.60	41.60

Aside from the fertilizing value of leaf litter, consideration must be given to the value arising from its mulching or water-absorbing properties. This value

is realized in the increased growth of the trees, if the litter is left in the woods, or of crops if it is transferred to cultivated fields. As a matter of fact, the value of the mechanical improvement of the soil through the application of woods mold is probably fully equal to the cost of gathering and applying it, leaving the chemical fertilizer value as a net profit in the transaction.

It appears likely that in a well-stocked stand of southern pine about a ton of litter per acre is dropped yearly. Because of decomposition, leaching, and wind action, the humus accumulates at a slow rate and apparently reaches an approximate balance between gain and loss.

Trees from the States Planted in Alaska

By R. F. TAYLOR, United States Forest Service

A beginning has been made in introducing exotic tree species into southeastern Alaska, with some results of promise.

Climate seems to offer no explanation for the absence from this region of tree species native to the shores of Puget Sound. Mean annual temperature for Juneau, Alaska, is approximately 42.2°; for Longmire Springs, Wash., it is approximately 43°. Annual precipitation averages for the two points are 80 and 103 inches, respectively. Douglas fir and other trees from the State of Washington have been favored in the choice of exotics for experimental planting.

One Douglas fir planted in 1913 at Sitka, near the national monument, is now 11½ feet tall and is making an average growth of from 10 to 12 inches a year. The 14 other trees of the same species that were planted with this one were destroyed by cattle. About 50 out of 100 Douglas firs from Washington procured by the Forest Service in 1922 for B. M. Behrends and planted on a glacial flat 9 miles from Juneau survived their first five years on the site and at the end of that time were making normal growth. Two dozen Douglas fir, 10 western yellow pine, and 6 silver fir from Washington planted at Seward in the spring of 1926 were reported a year later as doing well. In the spring of 1927 a shipment of 600 Douglas fir, 125 noble fir, and 125 silver fir from Washington were distributed at Ketchikan, Craig, Sitka, Cordova, and Anchorage and were planted mostly by forest rangers. Douglas firs that were properly cared for and planted on suitable sites have given good results; those handled without care have in most cases failed to survive. The silver fir and noble fir have not as a rule done very well, and redwood and western yellow pine show a tendency to pass out with little resistance.

Remarkable promise was shown by some Scotch pine from Illinois planted on the Mendenhall Flats, near Juneau, by J. P. Anderson, a local florist. After two years in the field the pines proceeded to grow 18 to 24 inches a season. This planting has been destroyed by cattle.

No information is yet available as to the ability of Douglas fir or Scotch pine planted in Alaska to produce viable seed.

The Oak Type of Arizona Woodland

By QUINCY RANGLES, United States Forest Service

Among the so-called woodland types of Arizona the oak type is rather an exception in that it makes fairly rapid growth. Growth studies show that in this type trees 12 inches in diameter outside the bark at stump height can develop from sprouts in 50 years. In general the Arizona woodland types make slow growth. Aside from the oaks these types, which for the most part occur at elevations below the western yellow pine type and on the drier sites within it, consist of juniper, juniper and piñon, and various other combinations. The use of the woodland species in the region is very largely for cordwood and posts.

In the oak type are represented approximately a dozen species, of which those forming the greater part of the volume of commercial stands are emory oak (*Q. emoryi*), occurring on the better sites, Arizona white oak (*Q. arizonica*), on the drier locations, and whiteleaf oak (*Q. hypoleuca*), occurring toward the upper limits of the type.

Reproduction in this type is almost entirely from sprouts. Not all the stumps sprout from the root collar. Counts in cut-over areas indicated that the proportion of the stumps having thrown out sprouts at their base varied from 25 per cent to 65 per cent, according to the maturity and soundness of the trees and the dryness of the site. Sprouts occur not only from the base of the stump but from the roots; and in spite of the fact that not all stumps sprout the stands are maintained in good shape, because a certain proportion of the roots throw out sprouts several feet away from the stump. As a rule, if fire and grazing are controlled the cut-over stands are maintained in good reproductive condition. A very good stand of young healthy trees of various ages was disclosed by recent examination of an area on which selective cutting has been going on for more than 50 years. This area has had good protection from fire and has been grazed rather lightly.

The oak makes an excellent fuel wood, although the juniper is preferred for this purpose by most people because it works up easily and is set on fire with much less difficulty than the oak.



Milwaukee, Wis., has been chosen as headquarters for the recently created Lake States National Forest District. District Forester E. W. Tinker will occupy offices in the Appraiser's Stores Building until the new Federal Building is ready for occupancy.

General Forest News

Selective Logging on Menominee Lands

By CROSBY A. HOAR, United States Forest Service

On the Menominee Indian Reservation, in north-eastern Wisconsin, selective timber cutting is now well established, under the direction of Forester Lloyd O. Grapp. The selective system was introduced in the winter of 1924-25, in the cutting of 35 acres. In the winter of 1925-26 80 acres were cut selectively, in 1926-27 370 acres, and in 1927-28 700 acres. The total area cut over each year has been from one to two sections. From now on Mr. Grapp intends to practice selective cutting exclusively or almost so.

The region is favorable for the growth of northern white pine, hemlock, and mixed hardwoods including chiefly maple, basswood, and yellow birch. The advanced second growth runs strongly to maple and basswood. Mr. Grapp tries to take out as much hemlock as possible from the mixed stands, but where hemlock is the predominant tree he cuts lightly. In other words, he intends to favor hardwoods over hemlock in general, but where hardwoods are scarce he is not willing to open up the stand by cutting hemlock heavily. The selective cutting is on a 35-year rotation. In 1926-27 it took 14,300 board feet to the acre and left 5,500 board feet.

All timber is marked for cutting. An interesting feature of the marking is that the upper blaze is placed at the point where the marker expects the cutters to saw. The stump height is regulated in that way instead of by an arbitrary rule. (The same practice is followed by the Goodman Lumber Co., Goodman, Wis.; and in this company's practice the blaze also indicates the direction in which the tree is to be thrown, being placed opposite the intended undercut.)

Mr. Grapp finds that selective cutting has not materially increased the cost of his logs loaded on cars in the woods. The cost of railroad spurs is somewhat higher because of the larger mileage required to produce the desired quantity of logs.

There is no slash disposal in the usual sense, but the quantity of brush left on the ground is reduced by cutting out and shipping all the top and limb wood down to about 4 inches in diameter. This is done under contract, the present contract calling for 10,000 cords to be taken from the woods by the operator and delivered to the manager of the Indian reservation at a stated price. The wood is sold green to a dealer who sorts it himself and resells it for various purposes such as chemical wood and firewood. This operation just about pays for itself. The slash left on the ground in most cases is small enough and is scattered evenly

enough not to present a serious fire menace. The cutting area that I visited when on the reservation last summer was in excellent shape.

Paper Company in Wisconsin Carrying Out Important Planting Program

The Nekoosa-Edwards Paper Co., Port Edwards, Wis., is beginning its fourth year of forestry work with 890 acres of land already planted, 180 acres plowed ready for spring planting, and about 1,900,000 young trees growing in its own nursery. The holdings of this company include something like 35,000 acres of land in Wood, Ashland, and Sawyer Counties, Wis. The company's planting equipment includes two 10-ton Holt caterpillar tractors, which pull 24-inch bottom-breaking plows. For protection from forest fires the company has supplied itself with three lookout towers, about 18 miles of telephone line, and three fire trucks with Evinrude fire pumps, Smith Indian hand fire pumps, and the necessary tools and pails.

From the first this company's forestry activities have been directed by F. George Kilp.

In the spring of 1926, 100,000 2-year-old seedlings were bought and planted on barren spots and open fields on the company's property. In the same season the nursery was started at Nepco Lake, with a capacity of 500,000 Norway pine and jack pine seedlings. Spring planting in 1927 was limited to 20,000 jack pine seedlings and transplants, because no more could be purchased from the Federal and State Governments; in the fall of that year, however, a planting crew was set to work with stock of the company's own raising. Planting was continued on a large scale in 1928. In that year, also, a reforestation survey of cut-over lands in Ashland and Sawyer Counties was completed and these lands were improved with the construction of 17 miles of telephone line, an 81-foot steel lookout tower with inclosed top, several miles of dirt road, and a 3-room tile ranger cabin.

In 1928, when the company's field planting operations covered many areas ranging from 1 to 12 acres in extent, its total planting costs per acre averaged \$5.66. (Approximately 1,350 trees were planted per acre.) In 1929, when he intends to plant 1,200 acres all in large areas, Mr. Kilp expects to keep expenses below \$5 an acre.

Seed have been bought to raise 3,500,000 trees in the company nursery during 1929.

Beginning with 1930, the company plans to plant 3,000 acres per year.

Lumber Industry Appeals for Legislation Controlling Production of Lumber

In a resolution adopted at its December meeting the board of directors of the National Lumber Manufacturers Association takes cognizance of efforts being made to obtain Federal and State legislation permitting control of production of oil and coal, and takes the position that any such legislation should likewise permit control of the production of lumber. Copies of this resolution were sent to the President of the United States, the President elect, the heads of the departments of the United States Government, and each Member and Member elect of the Seventy-first Congress.

Secretary of Agriculture Jardine, in commenting on the resolution, said:

Orderly production is essential not only to the financial welfare of the lumber industry itself but to the solution of the forest problem as a whole and the economic welfare of the Nation. For these reasons the problem of lumber production not only should be dealt with but should be dealt with constructively.

It must be realized, however, that overproduction is only one of many symptoms growing out of the greater evil of overexploitation of the forests. * * * The actual lumber surplus, while of great influence on market prices, is of little consequence to the conservation of our remaining timber supply compared with the immense quantities of low-grade material sacrificed in a general effort for early liquidation, and is of still less consequence compared with the loss of growth resulting from exploitation that fails to make proper provisions for a future forest.

* * * In my opinion the reasons for preventing the waste of timber are as forceful as those for preventing the waste of coal or oil. The proposed legislation to prevent the overproduction of oil grew out of investigations of the Federal Oil Conservation Board appointed by the President as a means of protecting the public interest against the waste of oil. Likewise, public assistance by legislation or otherwise to control production of lumber would have its justification in the protection of the public interest by preventing the waste of forest resources. There is a distinction between the two problems in that oil is a "wasting" resource, whereas timber would be perpetually renewable if our forests were properly handled. While the public has a large interest in using the present supply of timber without waste, it has a much larger interest in abolishing a more serious and in the long run a more costly type of waste, namely, the waste of the potential growing power of our forest land that is caused by destructive methods of exploitation. The waste of low-grade timber and the other wastes connected with timber manufacture and utilization are no more real than the waste resulting from operations that leave land unproductive. This waste of our basic forest resource is intimately associated with unregulated production. Any legislation or other public assistance to control the production of lumber to avoid waste of usable material should be coupled with plans and undertakings by the public and by forest owners to keep forest land productive and secure from destructive practices.

* * * It is true that an adequate program of reforestation requires the leadership, cooperation, and action of the Federal Government and the States, as the lumbermen's resolution has pointed out. It is equally true that this program requires the full and active participation of the private owners who control four-fifths of all forest land in the United States.

* * * There is need for a more complete understanding by all interested parties of the whole problem and the relationship of its different parts. This might be arrived at through the medium of a broad public inquiry, through a Government commission or otherwise, aimed at the formulation of a broad national forestry program involving specifically—

(1) Public assistance in strengthening and stabilizing the forest industries in order that they can undertake orderly production and continuous

timber growing as an industrial enterprise; and increased advice and assistance to farmers and other small forest owners.

(2) Larger public and private participation in forest fire protection in order to make it universal and effective.

(3) Large extension of Federal and State ownership, an immediate and assured means of restricting the field of destructive exploitation by bringing a larger proportion of the forest area under productive management as a measure of public security.

(4) Making public forests fully productive, especially through complete protection, more intensive management, and an adequate program of planting.

(5) Aggressive cooperation with forest owners and industries to abolish destructive forest exploitation and to create cooperative agencies to this end; and to stimulate larger industrial participation in an enlarged program of forest research.

(6) Investigation of the importance and feasibility of public measures to prevent destructive forest exploitation, including a study of public measures to this end in other countries.

Migratory Bird Sanctuaries Authorized

The Norbeck Act, signed by the President February 18, authorizes the creation of one or more natural woodland sanctuaries for game fowl and migratory birds in each State of the Union and in Alaska. Under the terms of this act a commission consisting of the Secretaries of Agriculture, Commerce, and the Interior, two Members of the Senate, and two Members of the House is to be responsible for selecting sites for these sanctuaries, working in cooperation with State authorities. The act authorizes an appropriation of \$75,000 for the first year, \$200,000 for the second, \$600,000 for the third, and \$1,000,000 for each of the succeeding seven years.

Congress Renames a National Park and Revises Boundaries of Another

An act of Congress recently approved gives the name Acadia National Park to the area on Mount Desert Island, Me., heretofore known as Lafayette National Park, and authorizes the Secretary of the Interior to accept as gifts for national park purposes certain headlands and islands off the island of Mount Desert. Another act recently given presidential approval provides for a revision of the boundaries of Lassen Volcanic National Park, Calif., to include approximately 24,280 acres of additional lands containing scenic features associated with volcanic phenomena and also some land that serves as a summer habitat for black-tail and mule deer and that is needed to provide adequate sanctuary and grazing ground for park animals.

A termite investigations committee has been organized by California industries. A fund of \$50,000 contributed by various industries is to be used by the committee in finding ways and means to combat the destruction by termites of buildings, railroad ties, telephone poles, and other exposed wood.

Oyster-Shell Scale Invades the Yosemite Lodgepole Not Taboo to Western Pine Beetle

By H. E. BURKE, United States Bureau of Entomology

An investigation made in the Yosemite Valley, Calif., during July and August, 1928, indicates that the oyster-shell scale (*Lepidosaphes ulmi* Linn.) has been working in the valley for several years. Many trees and shrubs have been killed, and many more are heavily infested and will die during the next few years unless control measures are undertaken.

The oyster-shell scale, a sucking insect, was introduced from Europe into the eastern United States before the Revolution. It has caused severe damage to several species of deciduous forest trees in many parts of the United States. According to published reports the ash is the tree most affected; but various species of poplar, willow, maple, and dogwood have been killed or seriously injured in New York, Ohio, Indiana, Illinois, North Carolina, Colorado, and Montana.

The most important deciduous tree on the floor of the Yosemite Valley is the black cottonwood (*Populus trichocarpa* Hooker). Checks made in various groves throughout the valley show that most of the trees of this species are infested and many have been killed by the scale. At the mouth of Cascade Creek 52 trees were found killed and 121 alive. Practically all the live trees were found to be infested, many so severely that they will probably die during the next two years. Near the mouth of Yosemite Creek 20 trees were found dead and 31 alive. West of the giant yellow pine, examination of a group of 31 trees showed that 23 were dead and the remaining 8 had but few living branches. These trees average about 18 inches in diameter and about 75 feet in height. In addition to the trees counted, many saplings one-half inch or larger in diameter were infested and dying or dead.

Besides the cottonwood, the pest in the Yosemite infests and kills the willows (*Salix lasiandra* Benth. and *S. lasiolepis* Benth.) and the creek dogwood (*Cornus occidentalis* [Torr. & Gray] Cov.); many groups of dead willows can be seen and a few groups of dead dogwood.

Numerous examinations disclosed no infestation of the white alder (*Alnus rhombifolia* Nutt.), the bigleaf maple (*Acer macrophyllum* Pursh), the Pacific dogwood (*Cornus nuttallii* Aud.), or the western azalea (*Azalea occidentalis* Torr. & Gray). In some localities branches of the Pacific dogwood interlaced with heavily infested branches of the creek dogwood were found to be clean. No scale could be found on aspen (*Populus tremuloides aurea* [Tidestrom] Daniels) examined in the Little Yosemite, which is 2,000 feet above the main valley.

The protection given to this insect by its waxy, armorlike scale makes it difficult to control. Spraying with lime-sulphur or with crude-oil emulsion when the brood hatches in the spring is recommended. If thoroughly applied at the proper time these sprays will kill most of the insects and will keep the infestation down for three or four years.

By F. P. KEEN, United States Bureau of Entomology

Near Bly, in Klamath County, Oreg., I recently found the western pine beetle (*Dendroctonus brevicomis* Lec.) vigorously attacking living lodgepole pines (*Pinus contorta* Loudon). Extensive galleries had been formed by the parent adults; eggs had been laid and larvæ had developed. In other trees a generation of the insects had reared its broods and the broods had emerged.

Forest entomologists of late had felt confident that the western pine beetle's attacks were restricted to western yellow pine (*Pinus ponderosa* Laws.) and Coulter pine (*Pinus coulteri* D. Don). In United States Bureau of Entomology Bulletin 83, Part I, 1909, A. D. Hopkins reported it as attacking sugar pine (*Pinus lambertiana* Dougl.); but for many years the authenticity of this record has been in doubt.

My observations indicating that the western pine beetle is quite capable of attacking and killing lodgepole pines were made on areas where many western yellow pines were being killed by the beetle. The attacks on the lodgepole pines represented an overflow. No immediate anxiety need be felt that the beetle will become a serious enemy to this pine, already oversupplied with destructive insect pests. Western yellow pine is still the preferred host, and attacks on lodgepole represent the abnormal or unusual condition. This is just another illustration of the adaptability of insect life and a warning not to attempt to lay down hard and fast rules of conduct for any insect species.

Fire, Beetle, and Budworm Change Stand Composition

A bit of forest war history from the Modoc National Forest is contributed by F. C. Craighead, of the Bureau of Entomology. On Sugar Hill, in the Warner Mountains, a fire occurring some 80 years ago killed a mature mixed stand of western yellow pine and fir. A dense stand of reproduction about half fir and half pine came in after the fire. This stand is now about 70 years old. It appears that the pine was dominant and was beginning to suppress the fir when between 1920 and 1922 it was attacked by the mountain pine beetle (*Dendroctonus monticolae*). More than 90 per cent of the pine was killed by the *Dendroctonus* attack, leaving a practically pure fir forest. The fir, however, was attacked by the spruce budworm in 1922, as it had been attacked also in 1915, according to evidence in the annual rings. A considerable portion of the fir died from this cause and from subsequent attack by the fir barkbeetle. The few pines that had survived the *Dendroctonus* attack undoubtedly benefited by this thinning of the fir, and it appears probable that the ultimate result will be again a mixed stand of fir and pine.

Satin Moth Regulated Area Extended

A revision of the quarantine on account of the satin moth, effective January 1, 1929, adds to the regulated area 21 towns in Maine, 51 in New Hampshire, 8 in Vermont, 33 in Massachusetts, and 59 in Connecticut. The new area amounts to about 5,116 square miles. This quarantine prohibits the movement of poplar and willow trees and parts thereof capable of propagation from the regulated territory to outside points; because the insect hibernates in inconspicuous webs on the bark of the trees, it is practically impossible to determine satisfactorily by inspection whether poplars and willows are infested with it or not.

Japanese Beetle Regulated Area Enlarged

A revision of the Japanese beetle quarantine, effective February 15, enlarges the regulated area to include part of Cecil County, Md.; 11 townships in the southern part of New Haven County, Conn.; all of Delaware north of Sussex County, and the town of Milford in that county; and Rye Township in Perry County, Pa. An additional regulated area is designated, consisting of the District of Columbia and part of Virginia; owing to the slight degree of infestation in this area, however, interstate movement of farm products from the area is to be unrestricted for the 1929 season. Shipments of farm products from New York City are brought under the same certification requirements as apply in the remainder of the main regulated area.

Western Red Cedar Shows at Front in Olympic Regatta

The shell in which the University of California crew raced to an Olympic championship last summer was built of western red cedar (*Thuja plicata*). It was the product of George Pocock, veteran shell builder of Seattle. Until two years ago Mr. Pocock built shells of "Spanish cedar" (*Cedrela odorata*). Substitution of the native western red cedar enabled him to cut 30 pounds from the weight of the shell, reducing it to 270 pounds—hardly 34 pounds to an oarsman. The oars used by the Californians were made by Pocock of Sitka spruce, each oar being built up of 13 different parts.

②

A 1,500-acre tract of cut-over long-leaf pine land in Caldwell Parish, La., is being developed as a reforestation area by Henry E. Hardtner, who in honor of Professor Chapman, of the Yale Forest School, has christened it the Herman H. Chapman Forest. The area has been fenced with hog-proof wire, fire lines have been built around and through it, and John Perkle has been installed as warden. Mr. Hardtner predicts that this land, worth not more than \$3,000 at present, in 60 years will produce more than \$1,000,000 worth of pine timber and by-products.

Pioneers Judged Soil Quality by Tree Species

[Excerpt from Travels to the Westward of the Alleghany Mountains, by F. A. MICHAUX, London, 1805]

In Kentucky, as well as in Pennsylvania, Virginia, and the Carolinas, the land is divided into three classes, for the more equal assessment of the land tax. This division, which is according to the fertility of the land, has a different relation in each State: thus, in Kentucky, for example, they put the same sort of land into the second class, which, east of the mountains, would belong to the first; and, in the third, they rank such as, in Georgia and Lower Carolina, would be put into the second. I do not, however, mean to be understood by this, that there are no lands in the Eastern States, as fertile as those of the West; but they are not common, and are seldom met with but by the sides of rivers and in the vallies, and do not include such a considerable extent of country as in Kentucky and that part of Tennessee to the westward of the Cumberland Mountains.

In these two States they appreciate the degree of fertility of the lands by the different species of trees which grow upon them: thus when the sale of a lot of land is advertised, they are careful to specify that such or such kind of trees grow on such or such parts, which is sufficient information to the purchaser. This rule, however, admits of an exception, with respect to the *Barrens* (meadows), the soil of which, as I have mentioned, is very fertile, and on which, nevertheless, there are found the *Scroby oak*, *Quercus nigra*, and the *Juglans hickery*, which, in the forests, are evidences of the worst soil. Supported by this mode of estimating the fecundity of the soil by the nature of the trees which it produces, I shall mention a very remarkable observation, which I made as soon as I arrived in this State.

In Kentucky and Cumberland (that part of Tennessee which lies west of the mountains of that name) independently of a few trees, which are peculiar to these countries, the mass of the forests, in lands of the first class, is composed of those species which are very rarely met with, to the east of the mountains, in the most fertile soils: these species are principally the following, *Cerasus virginiana*, cherry tree; *Juglans oblonga*, white walnut; *Pavia lutea*, buck eye; *Frazinus alba, nigra, cerulea*, white, black, and blue ash; *Celtis foliis villosis*, ackberry; *Ulmus viscosa*, slippery elm; *Quercus imbricaria*, black-jack oak; *Guilandina dioica*, coffeetree; *Gleditsia triacanthos*, honey locust; and, *Annona triloba*, papaw, which rises to the height of thirty feet. These three last species, in particular, denote the richest lands. In cool mountainous places, and by the sides of the rivers which have not steep banks, there are also found the *Quercus macrocarpa*, over cup white oak, the acorns of which are as large as a hen's egg; the *Acer saccharinum*, sugar maple; the *Fagus sylvatica*, beech; and also the *Platanus occiden-*

alis, plane; the *Liriodendrum tulipifera*, white and yellow tulip-tree; and the *Magnolia acuminata*, cucumber-tree, the three last of which attain to a circumference of eighteen or twenty feet. The plane grows to a larger size. The two species of tulip tree, with white and yellow wood, have no external character, either in the leaves, or in the flowers, by which they can be distinguished from each other, and as the yellow wood is most used, before a tree is felled, a piece is cut out, to ascertain whether it is of this species.

In the lands of the second class, are found *Fagus castanea*, chestnut; *Quercus rubra*, red oak; *Quercus tinctoria*, quercitron; *Laurus sassafras*, sassafras; *Diospiros virginiana*, persimmon; *Liquidambar styraciflua*, sweet gum; *Nyssa villosa*, gum-tree, a tree which neither yields gum, nor resin, as its name seems to imply.

Those of the third class, which are generally arid and mountainous, scarcely produce any but the black and red oak; the *Quercus prinus montana*, rocky oak, some pines, and sometimes Virginian cedars.

Does the Cypress Need Its Knees?

Cutting the knees of cypress trees near Belle River in St. Martin Parish, La., 14 years ago appears to have placed the trees at only a slight disadvantage as compared with untreated trees in the same stand. The cutting was done on 15 trees in May, 1914, by W. R. Mattoon of the United States Forest Service and E. T. Forgey of the Jeanerette Lumber & Shingle Co. At the same time 15 untreated trees of comparable size were tagged. The reexamination was made in July, 1928, by G. H. Lentz, special investigator for the Louisiana Division of Forestry, with the help of Mr. Forgey and J. A. Putnam. Difficulty was encountered in locating and identifying the trees; the 1-inch numbered copper tags with which they were marked had in nearly every identified case been overgrown with wood, often an inch or more in thickness, and at the time of reexamination the site was 3 feet deep in water. The 9 treated trees that were identified had all survived, and increment borings showed that although their diameter growth had slowed down slightly between 1914 and 1918 it had then become normal. On the 6 marked untreated trees that were identified in 1928 no retardation of growth had taken place. Although the depth of the water prevented definite observation as to whether the trees from which the knees were cut afterward developed new knees, no such new knees were detected in the reexamination.



The A. S. Carr Co. finds it profitable to ship crude resin from its operation in longleaf pine timber near Dorchester, Dorchester County, S. C., by railroad to its still in Savannah, Ga., a distance of 151 miles.

Seed Disinfectants in Forest Tree Seed Testing

By HENRY I. BALDWIN, Brown Co., Berlin, N. H.

One of the commonest difficulties encountered in seed testing is variation in the results obtained with two or more samples of the same lot of seed. In order to establish standards of accuracy certain tolerances of variation have been set up in agricultural seed-testing practice, and these may be applied as well to the testing of forest-tree seed. If two samples of the same lot of seed germinate under absolutely identical conditions the differences between them in germinative energy, final germination percentages, etc., represent the error of sampling, which follows the laws of probability more or less closely according to the mechanical accuracy of the sampling device and the seed counter. No matter how complete the control of physical factors, however, absolutely uniform germinative conditions seldom maintain in two samples, owing to inequality between samples in infection and growth of mold. Mold spores exist on nearly every seed coat, and mold development during the period of germination tests is practically inevitable unless the seed are disinfected in some manner. In disinfecting seed that are to be tested the sole purpose is to reduce the variation between duplicate samples by reducing uncontrolled mold attack; preferably the treatment should not stimulate or retard germination in uninfected seed.

In testing forest tree seed in soil and sand, Toumey, Bates, and others have tried partial disinfection of the soil and sand with formalin, sulphuric acid, etc. Usually this has somewhat reduced germination. In the last few years a considerable number of organic mercury compounds have been placed on the market, and have been tested eagerly by nearly all the agricultural experiment stations. In these preparations a small percentage of complex mercuric chloride compounds is combined with from 80 to 90 per cent of inert matter. Without going into the already large literature on the subject, or referring to the results of field experiments, it may be remarked that uniformly satisfactory results are not yet the rule, and that seed disinfection has not yet entered into the standard practice of the Association of Official Seed Analysts of North America or similar bodies. I will briefly describe some slight experiments of my own in using seed disinfectants in testing forest tree seed.

In these tests a water-bath apparatus adapted from the Jacobsen type of germinator was used. This apparatus, which is similar to those in use at nearly all the seed-testing laboratories for forest tree seed abroad, has given quite consistent results for two years. Only two treatments were tried—a 0.5 per cent solution of uspulun, and dry Bayer's Dipdust. In the first case the seed to be tested were soaked for 10 minutes in the uspulun solution and then thoroughly rinsed with dis-

tilled water on a strainer before being put in the germinator. Because of the difficulty of handling spruce and other small seed when wet, it was found necessary to dry the seed before counting them out and arranging them on the filter papers. Germination of seed treated with uspulun was invariably retarded. C. R. Orton, in charge of the research division of the Bayer Co.'s agricultural department, located at the Boyce Thompson Institute for Plant Research, recommended 0.25 per cent uspulun as a better concentration to use for tree seed. However, since a study nearing completion at the Brown Co.'s seed laboratory shows that spruce seed are injuriously affected by solutions having an alkaline reaction and seem to germinate best at a strongly acid H-ion concentration, it was decided to discard uspulun, which has a distinct alkaline reaction, pending more thorough investigation.

The procedure followed in trying Dipdust was in accordance with the recommendation of the Bayer Co. that the seed be shaken with no more dust than they would take up. For 1 bushel of seed 2 to 2.5 ounces of Dipdust suffice, or about 1 part in 2,500 by weight. With small samples of seed received for testing it is not always practicable to weigh out the Dipdust. In general, dust is being used in too great quantity if it can be detected on the seed coat with the unaided eye. In the tests here described, enough dust to cover a space about 2 millimeters wide on the end of a knife blade was shaken in a small bottle with 100 to 200 of the seed. Several samples of seed received for routine testing were set up with Dipdust, duplicate samples being set up untreated. A few of the results, condensed to show final figures only, are given in the following table:

Species	Germinative energy (per cent in 30 days)						Average variation between samples, and tolerance of variation			
	Untreated samples ¹			Samples ¹ treated with Dipdust			Un-treated		With Dipdust	
	A	B	Average	C	D	Average	Variation	Tolerance	Variation	Tolerance
Pinus strobus.....	52	61	56	85	82	83	9	10	3	7
Do.....	64	70	67	80	74	77	6	8	6	8
Abies concolor.....	54	48	51	60	60	60	6	10	0	9
Picea pungens.....	75	65	70	76	87	81	10	8	11	7
Thuja occidentalis.	24	35	29	46	36	41	11	10	10	10

¹ Abies concolor samples consisted of 50 seeds each. All others consisted of 100 seeds each.

At the end of 10 days it was already apparent that the Dipdust was effective in reducing the development of mold. At an early stage, also, the Dipdust samples showed markedly greater germination than the untreated ones. This advantage was somewhat diminished toward the end of the tests. The final average figures show 10 per cent greater germination with Dipdust, although in one or two individual cases no

significant advantage was apparent. In these cases less mold had developed on the untreated samples. It could not be ascertained definitely whether the higher percentages of germination in the treated samples were due merely to reduction in mortality from mold attack, or whether the chemical employed had a directly stimulating effect. The failure of treated samples to show more uniform results was disappointing. The variability was about the same with and without treatment, three out of five tests of each kind falling within the limits of accuracy.

On the basis of experience thus far, there would seem to be little merit in seed treatment in routine seed testing until careful experiment over a considerable length of time has given a firm basis for procedure and workable factors have been found for correlating tests under disinfected conditions with field conditions. These fragmentary results are presented in the hope that other workers may be led to attack the problem.

Whatever the value of seed disinfectants in seed testing, it would seem that their use in nursery practice might be well worth a trial.

Stock Company Organized to Manage Forest Lands

A stock company with a capital of \$50,000 has been organized in the town of Dublin, N. H., for the purpose of owning and managing forest land in the vicinity of Dublin Lake. Lawrence W. Rathbun, a recent graduate of the Yale Forest School, has been placed in charge of the land owned by the corporation and will also have charge of the management of forest lands owned by individual stockholders.

Foresters in the South

An enumeration by the Southern Forest Experiment Station has brought out the fact that 138 men are engaged in forestry work in the territory of this station, which includes Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas. All but 20 of these men have had some technical training in forestry or allied work. Lumber companies employ 32 of them, State forestry organizations 29, and the United States Forest Service 29. Consulting foresters and their staffs make up 19 of the number; men employed in forest products work, 16. There are 6 State extension foresters, 5 teachers in forest schools, and 2 city foresters. Residents in the territory who have had some forestry training but are not now engaged in forestry work number 43.

A bequest of \$5,000 has been made to Northeast, Erie County, Pa., by its former burgess, the late George E. Pierce, for the purpose of reforesting the municipal watershed of 250 acres.

Meeting of Society of American Foresters

At the annual meeting of the Society of American Foresters, held in New York City December 28-29 with an attendance of about 200 foresters, it was announced that \$30,000 has been given to the society by the Carnegie Corporation to finance a survey of problems in forest education. The survey will be conducted by the society's committee on education.

A resolution adopted at this meeting requests that the president of the society name a committee of three to take steps to bring to the attention of the President of the United States the importance of having a forester on the Mississippi River Commission. A second resolution requests the appointment of a committee of the society to consider problems connected with the maintenance of the productivity of forest lands in the United States and make recommendations to the society as to policies calculated to meet these problems. Other resolutions advocate that virgin areas of the more important original forest types be preserved by agencies controlling public forests; call attention to the too rapid exploitation of virgin timber, even in some areas in public ownership; recommend further investigation of spark-arrester problems by the American Society of Mechanical Engineers, and research at universities with the object of improving efficiency of combustion as well as of spark arrester design; urge that Congress make more adequate appropriations under the provisions of the Clarke-McNary law, the McSweeney-McNary law, and the McNary-

Woodruff law, and that it enable the Department of Agriculture to speed up the construction of fire-protection improvements on the national forests and to do the necessary work to control the gypsy moth east of the barrier zone; and commend the efforts of organizations and individuals in Arkansas to establish a State forestry department, extending the society's compliments to the governor and legislators of the State and offering its assistance in the formulation of suitable measures.

Officers elected by the society for the current year are: President, Paul G. Redington; vice president, John F. Preston; secretary, Raymond E. Marsh; treasurer, William N. Sparhawk; members of executive council, William G. Howard and J. S. Holmes.



The Long Island Railroad constructed about 60 miles of fire lines adjacent to its right of way in the summer and fall of 1928. Officials of the company recently met in conference with Superintendent of Lands and Forests W. G. Howard and other forestry officials of New York State to seek means of reducing the fires burning along the road's right of way.



A 140-acre grove of redwoods opposite Redway, Humboldt County, Calif., has been deeded to the Save the Redwoods League by Mrs. Harris Whittemore and family and is to be dedicated as a memorial to the late Harris G. Whittemore.

Foreign Notes

Prussia's Forest Service Budget

By W. N. SPARHAWK, United States Forest Service

The budget for the Prussian Forest Service for 1929 shows estimated gross income of \$50,287,567 and estimated expenditures of \$34,484,480, compared with actual income and expenditures in 1927 of \$47,873,103 and \$34,297,356, respectively. With a total State forest area of 6,078,870 acres, the estimated net income of \$15,803,087 means a net return of \$2.61 an acre. Owing to change in price levels this return per acre is actually less than the \$2.51 received in 1913. The timber cut for 1929 is set at approximately 363,600,000 cubic feet (slightly under 2 billion board feet), or 60 cubic feet per acre. The 1913 cut was 51 cubic feet per acre, from a total area almost 25 per cent larger.

The income expected by the forest service from different sources of revenue is as follows: Timber, \$45,220,000; other products, \$1,978,400; game,

\$261,800; peat, \$23,800; sale of land (agricultural, etc.), \$963,900; forest schools and experiment station, \$38,865; miscellaneous, including refunds of advances to forest officers, etc., \$1,803,802. The fairly high price expected for the timber, 12½ cents a cubic foot, is partly explained by the fact that timber is sold only after it has been cut and skidded to a road.

Salaries of full-time statutory officers for 1929 amount to \$6,305,572, and those of part-time officers, temporary assistants, etc., to \$1,129,963. In 1929 the organization will include 5,448 full-time and 1,898 part-time and temporary officers, compared with 6,290 of the former and 3,182 of the latter in 1913. For retirement and dependent's pensions \$2,105,709 is provided, and for other allowances and advances \$302,289. Besides, \$72,153 is to be contributed toward the cost of uniforms, \$30,535 is granted for purchase and maintenance of vehicles for officers, and \$146,370 is budgeted for accident insurance. Office

and travel expenses are estimated at \$1,079,061, and freight, telephone, printing, etc., at \$274,890. The largest single item of expenditure is for logging, \$8,806,000. Cost of making timber sales, leasing hunting privileges, etc., is estimated at \$433,160, cost of game administration at \$107,100, and cost of predatory animal control at \$206,060. For construction and maintenance of buildings, including some extraordinary construction necessitated by deterioration during the war period, \$1,576,440 is allowed, with a limit of \$9,500 on any one building; in addition \$71,400 is provided for forest laborers' quarters.

For planting, soil improvement, surveys, and cultural measures \$4,046,000 is provided, besides a special appropriation of \$1,190,000 to reforest areas devastated by the French and by the owl moth. Maintenance and construction of public roads within the State forests call for \$1,547,000 (approximately 25 cents an acre), and public roads and bridges outside the forests but of use in forest management call for \$142,800. For stream-control work \$71,400 is set up; for drainage, clearing fire lines, and establishing boundary lines, \$238,000. Only \$540,260 is allowed for purchase of forest land and for preliminary management plans for land thus acquired. In 1927, \$2,084,232 was spent for this purpose and the State forest area was increased by about 100,000 acres. It is interesting to note that in addition to constructing and maintaining public roads within and adjacent to State forests the State pays taxes to local governments on the State forests, these taxes for the year 1929 amounting to \$3,332,000, or 55 cents an acre. In 1913 the average tax was only 12.7 cents an acre. The forest schools, including ranger schools and the higher schools, get \$348,188, part of which is for new buildings. The average salary of the 18 full professors in the higher forest schools is only \$2,640. The forest experiment station (Eberswalde) gets only \$21,658, and even this is much more than was granted in 1927. The small appropriation for research may be partly explained by the close connection between the station and the school at Eberswalde, and the fact that much of the research work is done by the professors.

Living Fire Lines

For regions not subject to hard frost L. Lavauden of the French forest service, recommends fire guards of Eucalyptus. The Eucalyptus crowds and shades out other vegetation and clears the ground. The crowns are not very inflammable, so that they check the spread of fire. And such fire guards have certain advantages over cleared fire lines; they keep the land productive and they do not require constant renewal. Such fire guards have been used successfully in Tunis, according to M. Lavauden. The species recommended are *E. marginata*, *meliodora*, *obliqua*, *leucoxyton*, *brachypoda*, for dry rocky soil, and *E. doratoxyton* and *dumosa* for sandy soil.

Ontario Helps Counties to Establish Forests

In each of six counties in Ontario at least 1,000 acres of waste land owned by the county is being reforested by the provincial government. Any county purchasing 1,000 acres or more of suitable land for the purpose has the privilege of having the land planted and managed for 30 years by the provincial department of forestry. At the end of that period the county will have the option of resuming control of the property on payment of what the Province has spent on it, without interest; relinquishing claim to the property and receiving the purchase price from the Province, without interest; or sharing equally with the Province in the forest's management costs and earnings.

To encourage the establishment of demonstration plantings the Ontario government not only supplies free planting stock but does the planting for any municipality purchasing and fencing a small piece of land suitable for this purpose. More than 50 such plots have now been established.

For private reforestation work the provincial government offers any individual planter 3,500 trees a year without charge, the planter paying the expense of transportation. Besides this allowance 500 spruce and cedar are furnished to any resident for windbreak planting. Additional quantities of trees are supplied at \$4 a thousand.

Success with Douglas Fir in Belgium

Excellent results have been obtained from the planting of Douglas fir seed in arboreta of the Belgian Government, especially at Groenendael, and Douglas firs are being planted in Belgium in larger numbers every year, according to information reaching the United States Forest Service from the Belgian Director General of Forests and Waters. In the spring of 1929 a considerable area in the neighborhood of Vielsalm in the Ardennes is to be planted with several hundred thousand Douglas firs, some of which were grown from seed produced by firs planted at Groenendael 30 years ago. Small quantities of seed of Douglas fir and of other tree species native to the western part of the United States are being supplied to the Belgian Government by the United States Forest Service.



Under the administration of Francisco Salazar as chief of the forest service of Mexico the first lookout tower in that country has been erected in the Chihuahua Mountains. This is a wooden tower more than 100 feet high. With the cooperation of Daniel Galicia, a private forester, Mr. Salazar plans to build several lookout towers on the mountain tops surrounding Mexico City.

Forest Fire Protection in Java

When the easterly monsoon is blowing over Java, from June to September, the lower foothills and upper coastal plains of the eastern third of the island arc directly down wind from the great central desert of Australia. It is precisely in this driest section that the governmental teak forests are concentrated, writes Coert du Bois, United States consul general in Java, who is a former member of the United States Forest Service.

In Java teak sheds its leaves about the middle of August. The leaves are very large, on young trees and sprouts sometimes reaching the size of 18 by 9 inches; thus the resulting leaf litter is heavy. By September 1 this litter has dried out to a degree that invites fire, and before the first rains come it has about two months in which to dry out still further. A postponement of the rains till December 1 sets the stage for disastrous fires. An important factor in the fire hazard is the density of the population; with an area of 131,440 square kilometers (the kilometer is less than five-eighths of a mile), Java and the small neighboring island of Madoera have a population of nearly 36,000,000. On the average, about 5,000 fires are to be expected each year.

An ordinary surface fire in teak kills the young plants up to 1½ inches in diameter and damages the butts of older trees. Repeated fires result in loss of humus, decreased rate or complete stoppage of growth, erosion on hilly land, and occupation of the forest floor by "alang alang," a coarse, worthless grass (*Imperata* sp.), that is hard to eradicate and that is itself very inflammable. In new plantations a surface fire kills the young trees to the ground. They may or may not sprout, and often the whole burned area has to be replanted.

Early in the year, in preparation for the dry monsoon season, the Dutch foresters in charge of the 7,654 square kilometers of teak forest prepare plans covering the distribution of the laborers in the felling and planting areas with reference to their use as fire fighters. Each crew of woods laborers is instructed that in case of fire all other duties give way to fire fighting, and is made responsible for the protection of a certain area. In an emergency, a call for help in fighting fire is sent to the villages of the natives. In certain districts, if no fire occurs during the dry monsoon within a specified area adjacent to a village the Dutch authorities reward the village with a slamatan or native feast when the rains have started.

Roads, trails, and forest tramways are kept cleared so as to serve as firebreaks. On certain units regular firebreaks are laid out and cleaned on the windward side of areas needing special protection.

The organized detection service includes patrols, and lookouts on fixed points. There is no telephone system, but the Dutch foresters have taken advantage of a

native method of signalling by means of a hollow wood cylinder 1 to 1½ meters long with a vertical slit cut in one side. This is sounded by striking it with a hardwood bar. The sound, although not loud, has great carrying power. One of these wood signal drums hangs in the alun-alun or gathering place of every native village. Above the platform of each of the lookout towers, which are made of bamboo, is suspended one of these native drums. The lookout signals the location of smoke to the fire guards and to the surrounding villages by code, using a system of strokes and intervals that has been worked out and practiced in advance.

In the period 1923-1927, inclusive, the proportion of the teak forest burned over averaged 4.64 per cent a year, and the cost of protection averaged 19.2 cents Dutch (7.68 cents in United States currency). This represents protection of a considerably higher degree of intensiveness than that practiced on the national forests of the United States, Mr. Du Bois remarks; the costs are practically all labor costs, and unlimited forest labor is available at from 50 to 80 cents Dutch a day. A forest guard can be hired in the Java teak forests for the equivalent of \$7.20 U. S. a month.

In addition to the teak forests Java contains tropical hardwood forests covering 24,171 square kilometers, or 25 per cent of its area. The mass of these is located on the comparatively short, steep southern slope of the island, the Indian Ocean side. The jungle forest is essentially an evergreen forest, containing only a few deciduous species. The humus is deep and the litter heavy; but on account of the perennial overhead shade and the higher altitude it is only near the close of the dry monsoon, or when the dry season is unusually prolonged, that the jungle dries out sufficiently to present a real fire hazard. Intensive protection measures are not carried out on these forests.

Nearly Three-Quarters of New Zealand's Forest Land Is Government Owned

In the islands forming the Dominion of New Zealand, nearly 1 square mile in 5 is forest land. New Zealand forests that are economically exploitable at the present time have a total area of 5,646 square miles, officials of the Dominion reported at the British Empire Forestry Conference of 1928; protection forests and cut-over areas dedicated to forest conservation total 14,919 square miles. The volume of standing timber is estimated at 3,097.8 million cubic feet for conifers and 2,934.8 million cubic feet for broad-leaved species. The State owns 72 per cent of the forest land, corporate bodies own 17.6 per cent, and private individuals own 10.4 per cent.

Native wood consumed and exported amounts to 68,000,000 cubic feet yearly, forestry officials estimate. Timber exports are set at 7,400,000 cubic feet, imports at 8,700,000 cubic feet.

The results of recent investigations tend to indicate that in most of the forests of the Dominion, because

of overmaturity of the timber, loss by decay balances the increment. The loss by fire is practically negligible. With the possible exception of kauri and beech species, very little hope is entertained of the regeneration of the indigenous forests either naturally or by artificial means. The podocarp forests, which regenerate through a cycle of plant succession, present special complications.

The New Zealand Government has increased its yearly plantings of exotic forest species from less than 4,000 acres in the fiscal year 1923 to 35,000 acres in the fiscal year 1928. In these plantings very satisfactory results have been obtained with direct seeding, especially with spot sowing. Considerable reductions in the cost of raising seedlings have been brought about by the adoption of line sowing, and most of the species used are now raised in this way.

Monterey pine and Douglas fir are the principal species in these plantings. Other species used are *Pinus ponderosa*, *Pinus laricio*, and redwood.

By an act of 1927, 63,578 acres of State forest was vested in the Wellington city council for watershed protection and forestry purposes. This area, providing protection for the water supply of Wellington and adjacent boroughs, is controlled by a board consisting of four members of the city council and five representatives of the adjacent local authorities, with the mayor of Wellington as chairman. The act provides for the development of the area under the supervision of a competent forest officer and according to a working plan approved by the commissioner of State forests.

NOTE.—A discussion of commercial forest planting in New Zealand appeared in the January, 1929, number of the FOREST WORKER.

French Law Regulates Cutting of Chestnut

A law passed recently by the Parliament of France provides that any owner or operator desiring to cut more than 20 chestnut trees during the year must make a declaration in writing to the prefect of the department at least a month in advance. The declaration must indicate the place where the cutting is to be done, the number of trees to be cut, and whether the "ink disease" exists in the stand. Cuttings in coppice need not be declared. Every tree cut must be replaced, either by a sprout or by a planted tree, within two years. The pasturing of goats is forbidden for three years on lands on which reproduction is being established, except where the ink disease is present. Subsidies in cash and planting stock are provided for encouraging the establishment of chestnut in places where it seems desirable to encourage the growing of this species. A penalty of 50 to 500 francs is provided for failure to observe the regulation in regard to replacement of chestnut that is cut and of 5 to 10 francs for allowing grazing on the forbidden areas.



The Minister of Agriculture of Sweden has been authorized by the King in Council to appoint a committee of five for the purpose of investigating possibilities of converting into forest suitable ground that is not yet subjected to rational utilization. The committee will be required to submit a plan toward the realization of this purpose, indicating the extent of Government aid required.

Personals

Stephen T. Mather has resigned as director of the National Park Service because of illness. Mr. Mather entered the Department of the Interior in 1915 as assistant to the Secretary in charge of national parks, and has been Director of the National Park Service ever since the bureau was created in 1917. The new director of the service is Horace M. Albright, who has served since 1919 as superintendent of Yellowstone National Park and field assistant to the director. Mr. Albright first entered the department in 1913 as assistant attorney, was assigned to Mr. Mather as assistant and legal advisor in 1915, and was the first assistant director of the National Park Service.

Roger W. Toll, formerly superintendent of Rocky Mountain National Park, Colo., has succeeded to the superintendency of the Yellowstone.

John W. Spencer has been made assistant district forester of the Rocky Mountain National Forest District in charge of lands, succeeding Earl W. Tinker, now district forester of the Lake States National Forest District. A reorganization of the Denver office makes Mr. Spencer responsible also for the public relations work formerly handled by H. D. Cochran, who now holds Mr. Spencer's former position as assistant to the district forester in charge of forest management.

Officers elected by the Massachusetts Forestry Association at its thirty-first annual meeting are president, Harvey N. Shepard, Boston; secretary, Harris L. Reynolds, Belmont; treasurer, Ernest B. Dane, Brookline; executive committee, John S. Ames and Harry F. Gould.

Announcement is made by the Secretary of Agriculture of the formation of the Allegheny Forest Research Advisory Council, consisting of 18 residents of the Middle Atlantic States. The council will advise the Department of Agriculture as to a forest-research program to be followed by the department in that group of States; and within its region will endeavor to stimulate forest research on the part of all suitable agencies, to correlate all forest research so far as possible, and to further the advance of forestry practice. Those appointed to membership on the council are as follows: Charles P. Wilber, State forester, Trenton, N. J.; B. L. Livingston, Johns Hopkins University, Baltimore, Md.; O. E. Jennings, curator of botany, Carnegie Museum, Pittsburgh, Pa.; Henry W. Leeds, Haddon Hall, Atlantic City, N. J.; Jacob G. Lipman, director, New Jersey Agricultural Experiment Station, New Brunswick, N. J.; Philip S. Collins, vice president and treasurer, Curtis Publishing Co., Philadelphia, Pa.; A. J. Musser, general manager, Clearfield Bituminous Coal Corporation, Indiana, Pa.; E. C. M. Richards, Mount Carbon, Pottsville, Pa.; F. F. Nicola, Schenley Farms Co., Pittsburgh, Pa.; B. F. Tillson, general superintendent, New Jersey Zinc Co., Franklin, N. J.; Rodney H. True, department of botany, University of Pennsylvania, Philadelphia, Pa.; De Courcy W. Thom, Maryland Trust Building, Baltimore, Md.; Alexander R. Wheeler, Wheeler & Dusenbury Lumber Co., Endeavor, Pa.; Joseph W. Illick, State forester, Harrisburg, Pa.; J. A. Ferguson, department of forestry, Pennsylvania State College, State College, Pa.; H. H. Holzappel, general manager, Potomac Edison Co., Hagerstown, Md.; George W. Butz, Butz Lumber Co., Wilmington, Del.; and F. W. Besley, State forester, Baltimore, Md.

Members reappointed to the California Forest Research Advisory Council for 3-year terms are Swift Berry, F. H. Fowler, B. A. McAllaster, E. W. Murphy, and Spence D. Turner.

W. B. Lewis, formerly superintendent of Yosemite National Park, is the newly appointed assistant to the director of the National Park Service. C. G. Thomson has been transferred from the superintendency of Crater Lake National Park, Oreg., to Mr. Lewis's former post. Mr. Thomson's successor is Elbert C. Solinsky, formerly assistant to the superintendent of Yosemite National Park.

E. Phillips-Turner has succeeded L. MacIntosh Ellis as director of forestry for New Zealand. Mr. Phillips-Turner has had long experience in New Zealand forestry.

Alfred A. Doppel has resigned as district forester on the Eastern Shore of Maryland, to accept the position of forester with the Chamber of Commerce of the United States, Washington, D. C.

Paul V. Siggers has joined the Bureau of Plant Industry as forest pathologist and has been stationed at the Southern Forest Experiment Station. Mr. Siggers is a member of the 1914 forestry class of the University of Michigan who has had several years' experience in Costa Rica, Honduras, and Cuba with the United Fruit Co. and the Standard Fruit & Steamship Co.

W. L. Gooch has resigned as district forester for the Tidewater district of Virginia, and has taken a position as forester with the Hummel-Ross Fibre Corporation, a pulp-manufacturing company of Hopewell, Va. His place has been taken by George W. Dean, a graduate of the Pennsylvania State Forest School and of the Yale Forest School who has had experience on the Natural Bridge and Ouachita National Forests.

R. M. Volkert has been employed by the Great Southern Lumber Co., Bogalusa, La., as special redwood representative. He will engage principally in developing new uses for redwood in the North and East. Mr. Volkert was a member of the staff of the Forest Products Laboratory, Madison, Wis., for a 4-year period ending in 1925, and at that time made a study of the characteristics and uses of commercial woods, especially redwood. He has since been connected with the Union Lumber Co., Fort Bragg, Calif., in sales promotion and market development work in the Atlantic Coast region.

L. I. Barrett, junior forester at the Southern Forest Experiment Station, has been transferred to the Central States Forest Experiment Station. His place is being filled by the transfer of Roy A. Chapman from timber reconnaissance work in the Rocky Mountain National Forest District.

Ellwood S. Harrar, who received the B. S. degree from the New York State College of Forestry in 1927 and the M. S. degree from the same institution in 1928, is now an instructor in wood technology and wood utilization in the College of Forestry, University of Washington.

John C. Sammi has joined the faculty of the New York State College of Forestry, at Syracuse University, as instructor in forest engineering. Mr. Sammi is a forestry graduate of the University of California. He has had experience in national forest timber sales work in California, and more recently has been carrying on research work for the University of California in the redwood forests.

Officers elected by the Pennsylvania Forestry Association to serve during the present year are president, Samuel L. Smedley; president emeritus, Dr. Henry S. Drinker; secretary and treasurer, F. L. Bitler.

Bibliography

A Book on the Woody Plants of Alabama

By W. A. DAYTON, United States Forest Service

A treatise on the woody plants of Alabama by the geographer of that State, Roland M. Harper, has recently been issued by the Geological Survey of Alabama under the title "Catalogue of the Trees, Shrubs, and Vines of Alabama, with Their Economic Properties and Local Distribution." Doctor Harper is well known to foresters and to the scientific world in general as an informing and prolific writer on botanical, agricultural, sociological, and statistical subjects. This paper-bound book of 357 pages includes no keys, and the descriptions it gives are very brief; thus the work is in no sense a manual for identification purposes. Chief emphasis is placed on the distribution and economic notes which, naturally enough, are especially full in the case of the timber species. Frequent reference is made to work done in Alabama or with Alabama timber species by individual foresters. With the text are included 66 halftone illustrations of the vegetation; 23 line maps showing soils, ecology, meteorology, and vegetative distribution; a bibliography; and an index. Well-calendered paper has been used, and the typography is very good. To those interested in the ecology or economics of Alabama woody plants the work is invaluable.

This book is Part 2 of the Economic Botany of Alabama, of which Part 1, Geographical Report, by the same author, was published by the Alabama Geological Survey in 1913. It may be obtained by sending 15 cents in stamps to Walter B. Jones, State Geologist, University, Ala.

Index for Society of American Foresters Organs

A classified index to the Forestry Quarterly and the Proceedings of the Society of American Foresters from their first publication in 1902 and 1905, respectively, until their amalgamation as the Journal of Forestry, and to the Journal of Forestry from its beginning to and including 1926, has been prepared and issued in mimeographed form by the Forest Service, Department of the Interior, Canada. The plan followed in indexing the material is the outline for the classification

of forestry literature approved by the committee on forestry education of the Society of American Foresters and published in the Journal of Forestry, February, 1923, pages 148-161. The standard classification subdivision has been abridged to the first decimal place.

A Bulletin on Forest Insurance

By W. N. SPARHAWK, United States Forest Service

Forest Insurance and Its Application in Michigan, by Paul A. Herbert (Michigan State College Special Bulletin 179, 1928) presents an interesting discussion of the theory, objectives, and possible organization of forest fire insurance, including details as to methods of rating risks and appraising values, with special reference to Michigan. It is pointed out that "Michigan's forests are exposed to a very serious fire hazard and much must still be done * * * to lower the hazard to a reasonable level." The few stock companies writing forest insurance in the United States have had to charge such high rates that the volume of business has remained small. The author expresses doubts as to the feasibility of mutual or voluntary governmental insurance, and appears to favor compulsory governmental insurance under Federal auspices as probably the cheapest and most effective. It is estimated that average Michigan forests can be insured at rates ranging from about 90 cents per \$100 for hardwoods to about \$1.15 per \$100 for jack pine. The assertion that insurance will be taken out on the more hazardous forests first may be questioned, for it is admitted that European experience has shown insurance to be necessary not only where the hazard is high but also where it is low.

Valuation of forest property for insurance purposes is a particularly difficult problem in the case of immature timber, because insurance is usually based on sales value, and the sales value of young growth is much below its true or expectation value. It is suggested that replacement value be used for stands below one-third the rotation age, and average sales value for older stands.

It is doubtless true that, as Professor Herbert predicts, lower rates and a greater demand for forest insurance will come with better fire protection and higher stumpage values. He might have added "and with a serious intention on the part of a large number of owners to utilize their land for timber growing."

Climatic Cycles and Tree Growth

By G. A. PEARSON, United States Forest Service

A. E. Douglass's investigations of tree growth in relation to cycles of rainfall have great interest for foresters because of their promise of a means of long-range weather forecasting. His early investigations, the results of which he reported in a series of publications dating from 1909, pointed to more or less definite cycles in the occurrence of wide and narrow growth rings and to a correspondence of these cycles with variations in rainfall as shown by the available records of precipitation. Confirmation of such periodicity and correlation would make it possible to read climatic history in cross-sections of tree trunks and, by projecting established cycles into the future, to predict the coming of wet and dry periods. The present work, based upon a greatly increased volume of tree material collected over a wide range of territory, tends to corroborate and amplify the earlier findings.

The author describes in considerable detail his methods of collecting material and technique of measuring, recording, and analyzing the widths of annual rings. Due consideration is given to the many factors other than the climatic that may temporarily retard growth, such as competition, disease, insect injury, and fire. To a certain degree these factors are automatically taken into account; for the measurements are made on large and very old trees which, in order to attain such size and age, must have been dominant and relatively free from disturbing influences. Two instruments called the "plotting micrometer" and the "longitudinal plotter" transfer the ring records, on a magnified scale, to a strip of paper, in order to facilitate accurate measurement and analysis. A third instrument called the "cyclograph" is employed to detect periodicity in the occurrence of maxima in graphs of annual diameter growth.

Radial sections of western yellow pine from 10 western mountain States were studied. Individual trees in a given locality were found to correspond closely in periodicity, but trees of different regions were often found not to correspond. Comparison of smoothed curves revealed three western regions within which the curves are homogeneous. These are the Pacific coast region, centering in the Sierra Nevada; the Arizona region, centering in Flagstaff; and the Rocky Mountain region, centering in Pikes Peak. Cycles of 11 and 14 years appear to dominate on the coast, cycles of 14 and 21 years in Arizona, and cycles of 10 and 11 (or 23) years in the Rocky Mountains. When curves were plotted for points between these three regions, mixed effects were obtained.

The Flagstaff tree record, extending from 1300 to 1925, shows in addition to the 14 and 21 year cycles an 11.3-year cycle, interrupted from 1630 to 1850, that corresponds with the known sun-spot record. This

cycle appears also, with interruptions, in the Sequoia record, which extends back to 300 B. C. For certain periods Flagstaff trees show also a 7 and a 9.4 year cycle. Growth maxima, and presumably rainfall maxima, correspond with sun-spot minima. The dry years in the Flagstaff record analyze best on 14 and 21 year cycles, with major droughts at intervals of about 150 years and minor droughts at intervals of 40 or 50 years. In the Flagstaff area the projection of cycles observed to have occurred in the past 200 years would indicate large growth of trees in the 1930's and 1950's, with depressions in the early and late 1940's.

It should be explained that much remains to be learned about climatic cycles before the desired application of these studies becomes possible. If the precipitation curve rises and falls in regular waves, as many have assumed that it does, all should be simple. But it seems that the curve is far from regular. Instead of a single cycle operating uniformly through centuries, it appears that there are cycles of 7, 9, 11, 14, and 21 years, each operating with varying intensity. Sometimes two or more cycles may coincide with exaggerated effect, and again they may partially or wholly neutralize each other. Before the observations thus far made in this field can be applied in long-range weather forecasting, more must be learned about the causes behind each cycle.

(A. E. Douglass: *Climatic Cycles and Tree Growth*, Vol. II. A Study of Annual Rings of Trees in Relation to Climate and Solar Activity. Carnegie Institution of Washington, 1928.)

Vermont's Forest Industries

By W. N. SPARHAWK, United States Forest Service

A recent publication, prepared jointly by the Vermont Forest Service and the office of blister rust control of the United States Bureau of Plant Industry, gives a bird's-eye view of the rate of utilization of Vermont's forests. It shows that nearly two-thirds of the State is forest land (3,427,418 acres, against 2,792,000 acres estimated for the 1920 report by the United States Forest Service known as the Capper report) and that almost two-thirds of the forest is hardwood and only 10 per cent white pine, either pure or mixed with hardwoods. The average annual cut of lumber for 1924-1926, which is shown by counties and by kinds of wood, is put at 180,000,000 feet. This is considerably larger than the cut shown for the same years by the Census (122,000,000 feet) partly because it includes 43,000,000 feet used directly by wood-working factories. Of the 361 sawmills reporting, only 50 were portables; but 133 of the stationary mills were run by water power. Only 102 mills cut more than 500,000 feet, the average cut for stationary mills being 341,000 and that for portables 620,000 feet. Statistics of consumption include the logs and

lumber utilized by wood-using industries, classified by species and by counties. There are brief discussions of the requirements of individual industries, and directories of wood-using factories and sawmills. Of interest is the statement that "practically all of the white pine for pattern stock and shade rollers comes from outside the State. This is because white pine of a quality such as is demanded for these purposes can not be found in sufficient quantity in Vermont."

(Robert M. Ross and Perry H. Merrill: Annual Cut, Consumption, and Value of Forest Products in Vermont. pp. 47. Vermont Forestry Publication 32, 1928.)

Growth of Eucalypts in the Transvaal

By PERKINS COVILLE, United States Forest Service

Bulletin No. 21 of the Forest Department of the Union of South Africa brings together data on the growth and behavior of eucalypts in the high-lying subhumid and humid portions of the south central and southeastern Transvaal. This area has an elevation for the most part of approximately 5,000 feet or more, and is subject to a mean annual temperature between 55° and 62° F. Mean annual rainfall ranges in different localities from about 25 inches to nearly 70 inches.

Eucalypts were planted in this region at least as early as 1890. Since that time the Government and certain mining companies have established plantations of various species, and year after year private individuals and municipalities have followed their lead. Eucalypts are grown on farms as shelter belts and as woodlands for the production of firewood, poles, and fencing material, and are grown in plantations by farmers and others for commercial purposes—at present, principally for the production of props, lagging, and timber for use in mines.

The climate of the region is temperate, since altitude offsets the low latitude. Rainfall is confined almost entirely to the summer, which begins in October and lasts till March. Summer temperatures seldom exceed 90° F. Severe frosts occur nearly everywhere in the region, and limit very appreciably the choice of eucalypt species for propagation. Other adverse conditions are bitterly cold winter winds from the south, dry desiccating west winds occurring toward the end of winter and in the spring, and frequent droughts in spring and early summer.

The bulletin discusses the geology and soils of the area at some length and delimits three silvicultural zones, describing each with considerable detail as to climate and soil. For each zone histories are given of results with eucalypt plantations and recommendations are made as to the choice of species for planting. These recommendations vary according to soil type, "warmth" of site, soil moisture, and soil depth.

Next 65 species of eucalypts are listed with notes on such characteristics as drought resistance, soil requirements, hardiness, rate of growth, stem form, and quality of wood. In all but a few cases these notes are based on actual experience in planting the species in the area under discussion.

It is recorded of *E. viminalis* that an 18-year-old plantation at the Jessievale arboretum, after a thinning that left 134 trees per acre, had an average height of 104 feet and an average diameter of 13.7 inches. This species, however, is one of several that, after being planted extensively in the area, can not be recommended for further planting there at present because they are very severely attacked by the snout beetle. One popular species, *E. rostrata*, has shown variable results leading to the recognition of distinct strains. *E. globulus*, which has been tried out to some extent in the United States, has been widely tried out in one zone of the Transvaal, but suffers from drought and frost.

The bulletin closes with silvicultural observations upon such topics as selection of site and species, soil preparation, and "espacements." Thinnings, rotations, and yield are briefly discussed.

An appendix contains a table classifying eucalypt species as to susceptibility to snout beetle attack, a map of the Transvaal showing the three silvicultural zones defined in the text, and 13 illustrations of eucalypt stands or individuals.

This bulletin is comprehensive, is technically and editorially well done, and should prove of distinct value to anyone interested in planting and growing eucalypts in the Transvaal or elsewhere.

(J. J. Kotzé and C. S. Hubbard: The Growth of Eucalyptus on the High Veld and Southeastern Mountain Veld of the Transvaal. 59 pp. il., map. Government Printing and Stationery Office, Pretoria, 1928.)

Rocky Mountain Planting Report Available

The 1928 planting report for the Rocky Mountain National Forest District was recently issued by the Denver office of the United States Forest Service. This report covers both nursery and planting work done during the year on the national forests in Colorado, Nebraska, South Dakota, Wyoming, Michigan, and Minnesota. These are the forests on which the Forest Service does more than half its planting. The report contains full discussion of the planting developments of the year, tables of nursery stock and areas planted, and plans for the next five years' work. It does not deal with planting prior to 1928.

This report is available to the forest schools at the cost of making copies. Requests for it should be addressed to the District Forester, United States Forest Service, Denver, Colo.

Recent Books and Pamphlets

- Boadle, A. E.: The British lumber market. 352 pp. illus. (U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, trade promotion series no. 64.) Washington, D. C., 1928.
- Canadian Department of the Interior, Forest Service: The forests of Canada: their extent, character, ownership, management, products, and probable future. 56 pp. Ottawa, 1928.
- Connecticut State Park and Forest Commission: Report for the fiscal term ended June 30, 1928. 111 pp. illus. Hartford, 1928.
- Hanmer, L. F.: Public recreation: a study of parks, playgrounds, and other outdoor recreation facilities. 256 pp. illus., maps. (Regional plan of New York and its environs. Regional survey, vol. 5.) New York, 1928.
- New York Conservation Department: Eighteenth annual report, for the year 1928. 424 pp. illus. Albany, 1929.
- Pennsylvania Department of Forests and Waters: In Penn's woods: a guide to recreational opportunities in the State forests of Pennsylvania. 3d ed. rev. 99 pp. illus. (Bulletin 31.) Harrisburg, 1928.
- Rosendahl, C. O., and Butters, F. K.: Trees and shrubs of Minnesota. 385 pp. illus., map. The University of Minnesota Press, Minneapolis, 1928.
- Scott, C. A., and others: Trees of Kansas. 372 pp. illus. Kansas State Board of Agriculture, Topeka, 1928.
- Stebbing, E. P.: The forestry question in Great Britain. 217 pp. John Lane, The Bodley Head, Ltd., London, 1928.
- United States Department of Commerce: Seasoning, handling, and care of lumber: report of the National Committee on Wood Utilization (distributors' edition). 74 pp. illus. Washington, D. C., 1928.
- Unwin, A. H.: Goat-grazing and forestry in Cyprus. 163 pp. Crosby Lockwood & Son, London, 1928.
- Vermont Commissioner of Forestry: Biennial report for the term ending June 30, 1928. 63 pp. illus., map. Montpelier, 1928.
- Wisconsin State Conservation Commission: The forest crop law. 16 pp. Madison, 1927.
- Yard, R. S.: Our federal lands: a romance of American development. 360 pp. illus., map. Charles Scribner's Sons, New York, 1928.

Articles in Periodicals

- Forestry Chronicle, September, 1928.—The Aleza Lake forest experiment station: its development and purpose, by P. M. Barr, pp. 1-6; Methods for study of rate of growth, by W. M. Robertson, pp. 7-16. December, 1928.—The airplane and aerial photographs in forestry work, by E. Wilson, pp. 23-25.
- Forstwissenschaftliches Centralblatt, December 1, 1928.—Die Lage der Europäischen Wald- und Holz-

wirtschaft nach dem Kriege, by M. Endres, pp. 773-793. January 1, 1929.—Der Motorverstäuber im Dienste der Forstschädlingbekämpfung, by K. Escherich, pp. 1-14.

- Geographical Review, January, 1929.—Major world soil groups and some of their geographic implications, by L. A. Wolfanger, pp. 94-113, illus.
- Journal of the Royal Society of Arts, December 7, 1928.—Forestry in Sweden: its importance to and influence on Great Britain, by E. P. Stebbing, pp. 78-97.
- Pulp and Paper Magazine of Canada, November 22, 1928.—Forest conservation in British Columbia, by P. Z. Caverhill, pp. 1689-1694. December 20, 1928.—The sinkage of logs: its cause and prevention, by G. W. Scarth, pp. 1846-1853. January 17, 1929.—The effect of drainage on forest growth, by R. Zon and J. L. Averell, pp. 102-105.
- Quarterly Journal of Forestry, October, 1928.—Seed as a factor in silviculture, by G. Leven, pp. 247-253.
- Thrandter Forstliches Jahrbuch, 1929—Die zukünftige Rohstoffversorgung der Papierindustrie, by R. Lorenz, pp. 1-23, illus.
- Southern Lumberman, December 22, 1928.—Forest research in the South, by E. L. Demmon, pp. 209-211; What can be done with southern Appalachian cut-over areas, by J. H. Buell, pp. 211, 212.
- Timberman, January, 1929.—Port Orford cedar: its properties and uses, pp. 49-80; Salt treatment of posts, by C. W. Fox, pp. 90-93; Brush disposal, by H. T. Gisborne, pp. 194-196.
- West Coast Lumberman, January, 1929.—The problem of the small log in the big mill, by B. L. Grondal, pp. 10-11.

Recent Publications of the Forest Service

- Department Bulletin 1425, The Air Seasoning of Western Softwood Lumber.
- Miscellaneous Publications: 40, Forest Fire Prevention Handbook for the Schools of Washington; 41, Pulp-Timber Resources of Southeastern Alaska.
- Farmers' Bulletin 744, The Preservative Treatment of Farm Timbers (reprint).
- Yearbook Separate 847, How the Public Forests Are Handled (reprint).
- Leaflet 30, Cutting the Farm Woods "Profitwise."
- Miscellaneous Needs and Development of the Nation's Forestry Program.
- National Forest Map Folders: Rio Grande, Cherokee, Tonto, Ozark, San Juan, Coronado, Wenatchee.
- National Forest Administrative Maps: 1-inch, Western Division of the Apache; ½-inch, Ashland Division of the Custer, Ozark, San Juan; ¼-inch, Blackfoot, Ashland Division of the Custer, Klamath, Lemhi, Monterey Division of the Santa Barbara, Sequoia, Teton.
- Proclamation Diagrams: Helena, Missoula.