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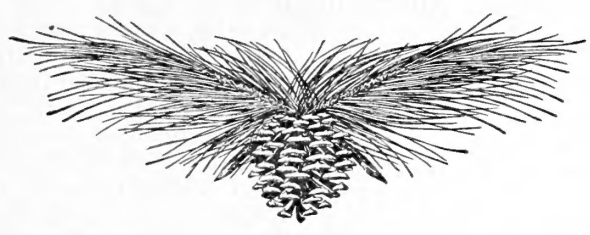
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# FOREST WORKER



*September, 1932*

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# Announcements

## Annual Meeting of Society of American Foresters

The Society of American Foresters will hold its thirty-second annual meeting in San Francisco, Calif., December 12-16, 1932. The first two days, December 12 and 13, will be devoted to meetings of the Council, while other members will have the opportunity of making trips into the redwood and Sierra regions. The general sessions, with papers and discussions, will be held December 14-15, with the following day, December 16, scheduled for Society affairs. Following the meeting in San Francisco, two days, December 17 and 18, will be spent in field trips in southern California out of Los Angeles.

## Pack Fellowships for 1933-34 Available

Fellowships in forestry are again offered by the Charles Lathrop Pack Forest Education Board for the purpose of "encouraging men who have shown unusual intellectual and personal qualities to obtain training that will best equip them for responsible work, either in the general practice of forestry, in the forest industries, in the teaching of forestry, in forest research, or in the development of public forest policy." In awarding the fellowships no restrictions are made as to age, educational status, or practical experience, but ordinarily they will be granted only to American or Canadian citizens who have completed an undergraduate college course or its equivalent. Grants may be made for

study at a school of forestry or an institute of research, on a forest under management, in association with forest industries, or in travel. Fellows will be expected to devote their full time to the work for which the fellowships are awarded.

Applications for fellowships for 1933-34 must be made to the secretary of the board, at 1214 Sixteenth Street NW., Washington, D. C., by January 1, 1933. The necessary application form and further information will be supplied by the secretary on request.

## Data on Cone Crops of Southern Pines

Estimates of the 1932 cone crops of all species of southern pines in terms of bushels of cones actually collectible, information as to expected logging operations this fall in bearing stands, and names of local collectors have been compiled and mimeographed for distribution by an intersection committee of the Society of American Foresters headed by Philip C. Wakeley. Copies may be obtained from Mr. Wakeley, whose address is the Southern Forest Experiment Station, 600 Stern Building, New Orleans, La. These data are being brought together each year for the purpose of helping planters of southern pines to locate adequate and suitable supplies of seed as well as to establish records as a basis for study and analysis of seed production.

The 1932 cone crop is in general light, but an abundance of cones of each species is reported from a few widely separated points.

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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

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## State Forestry

### Mississippi Law Provides for Forest Protection Tax

A law has been passed by the Mississippi Legislature which provides that county boards of supervisors may make special assessments for protection of timbered and uncultivable lands from fire upon receipt of a petition signed by a majority of the freeholders of the area to be protected. The Attorney General of Mississippi has declared the law constitutional. According to State Forester Fred B. Merrill, such a tax will enable landowners to obtain protection from woods fires at about half the cost formerly paid. Instead of 4 cents per acre per year for protection, a county payment of 1 cent per acre in north Mississippi or 2 cents in south Mississippi should be sufficient. A sum about equal to that raised in a county will be provided by the State forestry commission for protection work in that county. The special annual tax shall not exceed 3 cents per acre.

The forest tax law of 1924, which provided a 10-year exemption on young growing timber, having been found unworkable, was repealed by the legislature at the request of the State forestry commission.

The text of the new law is as follows:

SECTION 1. *Be it enacted by the Legislature of the State of Mississippi*, That for the purpose of receiving the financial and supervisory cooperation of the Mississippi Forestry Commission in forest protection, any board of supervisors is empowered and authorized, in its discretion, to assess and levy a special annual tax not to exceed three cents (3 cents) per acre against the timbered and uncultivable acreage of the county, said acreage to be known as a forest protection area.

SEC. 2. And further, that for the purpose of receiving the financial and supervisory cooperation of the Mississippi Forestry Commission in forest protection, the board of supervisors is required to make and assess such an annual tax upon all said lands in the county, or any definitely described portion thereof, upon receipt of a petition so requesting, signed by a majority of the freeholders of the county, or definitely described portion thereof; said area to be known as a forest protection area.

SEC. 3. Said tax shall remain the same from year to year, except that it may be changed or discontinued upon receipt of a petition, so requesting, signed by a majority of the freeholders of the county, or definitely described portion thereof, involved, or by the Mississippi Forestry Commission.

SEC. 4. That the tax so assessed shall be collected as other taxes are collected and remitted to a proper county depository or to the State Treasurer and placed in a special fund set up for the county, or definitely described portion thereof; said fund to be expended by the Mississippi Forestry Commission for forest fire protection in the county, or definitely described portion thereof, against which the tax has been assessed.

SEC. 5. That this act shall take effect and be in force from and after its passage.

### Nursery Costs in Tennessee Reduced by New Seed Planter

A machine which plants forest-tree seed in even rows, covers them with earth to the depth desired, and rolls the bed, in one operation, has been perfected after several years of experiments by James O. Hazard, State forester of Tennessee. By the use of this new planter, expenditures for seed, planting, and seedling culture have been greatly reduced and the necessity of transplanting has been eliminated in the State nursery at Jackson, Tenn. As sown by this machine one pound of seed of such species as red pine, shortleaf pine, Norway spruce, and black locust has proved sufficient for a bed 100 feet long by 4 feet wide. A crew of four men, proceeding at a slow walk, can easily operate the planter, which distributes the seed evenly lengthwise of the bed in eight rows or bands approximately 2 inches wide and 6 inches apart from center to center. The amount of seed to be sown can be varied as desired. With this machine available a small crew is able to make up beds until late in the afternoon and then in a very short time plant all the prepared ground while the earth is in good tilth.

Weeding costs are reduced by the growing of the seedlings in evenly spaced rows, since wheel cultivators and hand weeders are used to work the 4-inch spaces between the rows, eliminating much of the hand weeding necessary in broadcast-sown beds. Transplanting of seedlings grown from seed planted in this manner is not necessary because they develop substantial stems and sturdy root systems in the bed. Locust, loblolly pine, and shortleaf pine seedlings are of suitable size for planting in the field in one year, and those of white pine, red pine, and Norway spruce in two years.

## Idaho and Montana Install Volunteer Fire Wardens

Unusual action has been taken by the governors of two western States, J. E. Erickson, of Montana, and C. Ben Ross, of Idaho, in issuing appeals to their citizens for voluntary aid in protection of forest lands from fire. Funds for forest protection—private, State, and Federal—are low this year, and help is badly needed in prevention of man-caused fires and in law enforcement. In each State more than 1,500 citizens who have accepted appointment from their State forester as volunteer fire wardens have become known as the Vigilante Volunteers. In accepting their aid in Montana, Governor Erickson said in part:

Realizing their individual responsibility, these public-spirited citizens have asked for appointment as volunteer fire wardens. Determined to stop the toll of death, damage, and destruction in Montana's forests and on her forest lands, they have banded together as did the vigilante committees of pioneer days, donating their services for the common good.

Operating with all the power conferred upon them by the fire and forest laws of their State, they have declared war against carelessness and incendiarism. Squarely behind them stands the power of the State and its criminal procedure applicable in the enforcement of those laws.

The State of Montana, through its forestry department, welcomes the active assistance of these public-spirited citizens. It is urged that their efforts be concentrated upon education and law enforcement.

Every judge, district attorney, and justice of the peace in both States has also been enlisted in the cause of fire-law enforcement in the drive to prevent fires caused by carelessness and incendiarism.

## Indiana Has Made Rapid Strides in Acquisition of State Forest Lands

Since 1925, when the Indiana Legislature placed a ½-mill tax on each \$100 worth of taxable property and provided that the money thus raised be used in part for the purchase of lands for State forests, the State forest area of Indiana has grown from 2,897 acres to 22,527 acres. A total of approximately \$25,000 annually was made available at the ½-mill rate; in 1927 the legislature increased the levy to 1 mill, or about \$50,000 annually. The tax for forestry purposes was again doubled in 1929, providing approximately \$100,000 a year. This money forms a State forestry fund which, according to the Indiana law, is "to be expended by the department of conservation in the purchase, supervision, and development of State forests and State forest lands and in the growing of forest-tree seedlings for State and private forest planting."

Indiana now has five State forests, all in the southern part of the State. They are used by 150,000 people each year for outdoor recreation; they provide game and wild-life refuges; and on them correct methods of

tree planting and silviculture are demonstrated to private owners of adjoining timberlands. Protection of the timber from fire and reforestation of worn-out and eroding lands within the forests are carried on through use of the forestry fund. Three State tree nurseries have been established and now contain about 25,000,000 trees which are sold at cost of production.

## Fire-Line Plow Performs Well in Delaware Demonstration

By C. R. TILLOTSON, United States Forest Service

A demonstration of a fire-line plow was arranged in southern Delaware on August 9 by State Forester W. S. Taber. The plow, of the Hester 5-disk type pulled by a 30 Caterpillar tractor, acquitted itself admirably under rather difficult conditions. The fire-break was made by a double plowing of the strip, the plow being pulled across the area and back again in the same furrow. About half a mile of this type of line was constructed per hour.

In that part of Delaware there are extensive areas of drained swamp land not traversed by roads where some severe forest fires have occurred. In 1929 fire burned over an area upon which there was a thick stand of loblolly pine, pond pine, and southern white cedar. The timber was not large enough or valuable enough to salvage, and after the fire most of it toppled over. A very dense stand of loblolly pine reproduction sprang up which now averages about 3 feet in height. A short time ago another fire started in this area and was still burning in the peat-like soil at the time of the demonstration.

Because of the down timber, most of it half rotted, and the dense stand of young growth, it was necessary to use two or three men in front of the tractor to throw some of the logs out of the way and two or three behind to clear the plow itself of logs and chunks of wood that tended to pile up in it. The plow made a furrow which averaged about 1 foot deep and 3 to 5 feet wide. At times the turf fell back into the furrow so that the line was not everywhere perfect, but it could very easily have been cleared up by two or three additional men with shovels.

Although the year's quota of 50,000 acres to be purchased by the State of New York as part of the reforestation program under the Hewitt amendment had already been exceeded by acquisition of 50,253 acres up to July 1, purchases will be continued during the remainder of 1932. The funds available for this purpose have not nearly been exhausted, according to Conservation Commissioner Henry Morgenthau, jr. The work of reforesting these lands is also being completed ahead of schedule.

## Two Protection Units Added by Los Angeles County Forestry Department

A 50-foot lookout tower and a permanent patrol station recently constructed by the Los Angeles County Forestry Department should add greatly to the efficiency of the fire control organization in a highly hazardous mountain area where there are many summer homes and valuable properties, according to Spence D. Turner, county forester.

The lookout tower, of all-steel construction, has been erected on Bodle Peak, on the western side of the Santa Monica Mountains, 4 miles west of Seminole Hot Springs, at an elevation of 2,450 feet. It has an observation radius of approximately 50 miles, including a part of Ventura County.

The station is located at Lechusa on the Decker road, about 5 miles north of the Roosevelt highway. This unit includes a station building, a 3-car garage, and facilities for the care of pack stock. The building has a wide observation range and the men on duty will be able to act as lookouts.

The Los Angeles County Forestry Department now has 20 permanent and 4 temporary patrol stations at strategic points throughout the county, which is divided into five field divisions to decentralize administration and speed up fire suppression. There are 14 lookout towers within the county, 1 constructed by the city of Los Angeles, 5 under the control of the county fire warden, and 8 within the Angeles National Forest, 4 of which were built by the Los Angeles County Forestry Department under cooperative agreements.

## Mississippi's First State Forest

Created by an act of the legislature, the University State Forest is the first tract to be set aside by Mississippi for production of timber and public recreation. For five years this 23,000-acre area of university land in Stone, Harrison, George, and Jackson Counties has been protected from fire by the Mississippi Forestry Commission, and according to State Forester Fred B. Merrill the greater part of the area contains excellent natural reproduction.

Control of the property is in the hands of the board of trustees of State institutions of higher learning, which is authorized to contract with the State forestry commission for protection and management of the forest and to permit the State game and fish commission to use the lands as a game preserve.



In Michigan, as in a number of other States, a new system of hiring labor for fighting fires has been inaugurated this year. Formerly emergency help was drafted under a State law providing for the summoning of citizens to fight forest fires. Under the new plan labor

is obtained from lists of unemployed men maintained by welfare agencies and paid at a rate of 15 cents an hour, one-half that formerly paid. The system is proving efficient, and it is hoped that the reduced pay and selection of fire fighters from official lists only will discourage incendiaries who set fires for the purpose of getting work.

## State-Wide Forest System Recommended for Tennessee

A system of State forests in Tennessee, so situated as to serve advantageously as "forestry service stations" for the various regions of the State, is the recommendation of State Forester James O. Hazard. Each forest would ultimately contain at least 10,000 acres, according to the plan. In advocating the establishment of such a system of forests, Mr. Hazard states that they can be used to help stabilize local forest industries and to serve as centers for such State forestry activities as fire control, forestry demonstrations, reverted tax land administration, wild-life conservation, and public recreation. He also recommends the use of State forests in part for permanent game refuges and in part for public hunting and fishing grounds.

An attempt will be made to secure the passage of a law at the next session of the Tennessee Legislature to permit the use of suitable tax-reverted lands for State forests, says Mr. Hazard, as the first legal step in securing the adoption of this plan. In the meantime, the Tennessee Forest Service staff is directing public attention to the possibility of establishing such forests at strategic points in the various counties, and much interest is being shown by many local leaders.

With such a system of forests as a foundation, Mr. Hazard believes that the future forest needs of the State could be met with a minimum of expense and a maximum of public benefits.

## Demonstration Forest Donated to Georgia

Forest possibilities of the sand-hill region of Georgia will be demonstrated on 100 acres of land in Richmond County donated to the State by Scott Nixon, acting for the Nixon estate. The gift was accepted by the Georgia Department of Forestry and Geological Development, and C. N. Elliott, district forester at Augusta, has been appointed to carry out the demonstration project. Bright McConnell, county agent of Richmond County, and L. S. Moody, secretary of the Augusta Chamber of Commerce, will cooperate with Mr. Elliott.



Coal operators in Indiana planted 215,200 trees this spring on stripped-over coal lands in the southwestern part of the State.

## Gipsy Moth Found in Pennsylvania

Discovery of the gipsy moth in northeastern Pennsylvania, near Pittston, Luzerne County, has caused an investigation of the infested area, which was found to be approximately 8 miles by 4 miles. The extent of the infestation indicates that the gipsy moth must have been present in this region for about 15 years. Eradication measures will be undertaken by the Pennsylvania Department of Agriculture, the State Department of Forests and Waters, and the Bureau of Plant Quarantine of the United States Department of Agriculture.

The area invaded by the insect is in an outlying district in the mountains consisting principally of cut-over land. Since there are no nurseries in the region and there have been practically no shipments of plants or trees, a quarantine will not be imposed.

## Michigan Conservation Department Aids in Establishing Forests

Under authority of an act of the 1931 Michigan Legislature providing for the establishment of forests by municipalities, counties, and village or school districts, the conservation department of the State has sold tracts of land to a county and a school district for the nominal sum of \$1 each. Midland County obtained 320 acres and the Beaverton agricultural school district, in Gladwin County, 40 acres. In addition to providing the land, the department will furnish pine seedlings for planting the areas from its nursery at Higgins Lake.

The terms of the sale provide that should the county or district at any time stop using the properties for forests the land will revert to the State.

The 60 public parks comprising New York State's extensive park system offer exceptional recreational attractions to visitors, from ocean beaches on Long

Island to the wild mountain scenery of the Adirondacks. A 136-page booklet describing the facilities of the parks, illustrated with nearly 200 photographs, can be obtained free from the Publication Bureau of the State Conservation Department, State Office Building, Albany, N. Y.

## New Timber Protective Organizations Formed in Georgia

A timber protective organization has been formed in Burke County, Ga., with plans to carry out a full program of fire protection for nearly 20,000 acres of forest land, according to the Georgia Department of Forestry and Geological Development, and indications are that many more landowners in the county will list their holdings for protection. It was estimated that approximately 90 per cent of the county was burned over last year.

In northwestern Ware County the Bickley Timber Protective Organization has been formed by owners of approximately 10,000 acres, and in Dodge County 11 landowners, controlling 10,435 acres, have organized for forest protection.

Ten million trees a year will be planted by Wisconsin under a reforestation program begun this year. The State conservation department set out 5,348,000 trees this spring on 5,607 acres of State land. Five million more will be planted during the fall season to complete the 1932 quota.

Georgia has the largest forest land area of any State, according to State Forester B. M. Lufburrow. The present commercial forest area is 22,872,000 acres, of which 1,150,000 acres contains old-growth forest, 20,143,000 acres second growth, and 1,579,000 acres is forest land not at present producing valuable timber.

# Education and Extension

## Forestry To Be Taught in Vocational Schools of East Texas

Cooperative plans have been approved by the Texas Forest Service and the State Board of Vocational Education for the inclusion of forestry in the annual teaching plan for vocational agricultural schools in east Texas. Courses will be offered in planting and managing the farm woods and marketing farm timber.

Practically every farm in the 33 counties which constitute the commercial timber region of east Texas has

its tract of woodland—46 per cent of the 7,593,118 acres owned by farmers in this region is in timber. While some of this timbered area is well cared for, much of it has been continually cut over and now produces nothing but a small amount of fuel wood. The farm boys from the region who study forestry in the vocational schools will learn how to reforest denuded areas, protect the farm woods, estimate the stand of timber, carry on silvicultural management to increase the annual volume growth, and how to market the timber cut. Each school will have a forest area where practical instruc-



tion will be given, and the students will be encouraged to carry out a forestry project in their own farm woods.

It is expected that the forestry work to be started in east Texas this fall will eventually be extended to vocational agricultural schools throughout the State.

## Mount Toby Forest Has Educational and Recreational Values

By R. P. HOLDSWORTH, Professor of Forestry, Massachusetts State College

The Mount Toby Forest provides a valuable demonstration laboratory in forestry for the Massachusetts State College, by which it was purchased in 1916. The tract of 775 acres lies principally in the town of Sunderland, Mass., about 9 miles from Amherst, and also furnishes an accessible recreational area for the region. It is in one solid block, including the peak of Mount Toby, where the State maintains a fire tower, Ox Hill, parts of Roaring Mountain and Hemlock Hill, and the entire 5½ acres of Cranberry Pond. Elevations vary from 440 feet at the pond to 1,290 feet at the summit of Mount Toby.

Eleven cover types are represented in the forest, which is on the border line between the central hardwood and northeastern forest regions. They range from mixed oaks to pure hemlock and white pine. Experimental plantations of spruce, of which only scattered specimens occur naturally, have been established. A recent inventory shows a growing stock of approximately 3,500,000 board feet of softwoods and 8,600 cords of hardwoods.

Courses in forestry at the Massachusetts State College, though they do not lead to a degree, are designed as valuable auxiliaries to degree courses; they are explanatory of the field of forestry for those students who are looking forward to the study of professional forestry in one of the graduate schools. The Stockbridge School of Agriculture on the same campus, a 2-year vocational school, gives work in "estate forestry" which is designed to be definitely practical. The Mount Toby forest provides a field laboratory for the carrying out of problems in practical and experimental forestry, and students in both the college and the Stockbridge School take part in and observe operations on the forest, including experimental thinning, planting, pruning, and other silvicultural work.

Small sales of timber are made from time to time to mills in the neighborhood, the owners of which are interested in sustained yield and permanence of supply. One of these, a water-power mill, is equipped with modern finishing machinery and good stock is turned out from native timber; a box factory is operated by the same owner. The chestnut which was originally an important component of the forest stands was removed some years ago and sold, returning a considerable portion of the forest purchase price. Timber injured by an ice storm was also salvaged.

Type and age class maps have been made for the forest, and there is an excellent, up-to-date topographical and improvement map. A system of coordinates has been established and staked out on the ground so that it is easy to tie in various small projects which are under way. A wild-life survey is being made and map records kept in an attempt to follow the seasonal activities of the wild life of the forest.

The deep valley of Roaring Brook, running from west to east under the steep slopes of Ox Hill and Roaring Mountain, has been tentatively reserved as a natural area and recreation ground. From here the fire tower on Mount Toby, which affords a splendid view of the middle Connecticut Valley and the Berkshires, is accessible.

All visitors to the forest are welcome, but visiting foresters are not willingly allowed to depart until they have contributed a constructive idea or two toward the management of the forest.

## Beal Memorial Unveiled at Michigan State College

A memorial to William James Beal, first professor of forestry in Michigan, was unveiled in the pinetum of Michigan State College, at East Lansing, on June 11. Foresters of the class of 1911 presented the memorial, a large field stone upon which is mounted a bronze tablet with a likeness of Doctor Beal and the inscription, "William James Beal, professor of botany and forestry 1870-1916, 'father of Michigan forestry,' planted this pinetum in 1896. Placed in his memory by 1911 foresters. 'Keep on squintin'.'" ("Keep on squintin'" was a favorite expression of Doctor Beal in encouraging students to further efforts with the microscope.)

The president of the college, Robert S. Shaw, in accepting the memorial, suggested that the pinetum be named for Doctor Beal. The tablet was unveiled by Harry Lee Baker, State forester of Florida, a member of the 1911 class. Other members of the class who took part in the exercises were H. B. Wales, assistant regional forester of national forest region 9, C. W. McKibbin, formerly with the Forest Service, and F. E. Wilson, chief forest fire warden of Wisconsin. G. H. Collingwood, forester of the American Forestry Association, who originally suggested the memorial, was unable to be present at the unveiling.



A record planting of 264,000 forest trees was made this year by 4-H club boys and other groups in Kershaw County, S. C., under the direction of Henry D. Green, county agricultural agent. Having no funds available for distributing the trees Mr. Green delivered them himself, hauling them in a trailer behind his automobile. The boys met him at scheduled stops and received their trees.

## Four-H Club Planting Activities in New York Expanding

As a part of their 4-H forestry club projects this year, New York State farm boys and girls planted nearly 1,500,000 trees, according to J. E. Davis of the forestry department of the New York State College of Agriculture at Cornell. This exceeds the 1931 record by nearly half a million trees. The species planted are mostly white pine, red pine, Norway spruce, and white spruce, with some European larch, black locust, and white cedar planted for fence posts. Each of the 1,384 club members received 1,000 trees free from the State conservation department, and nearly 116,000 more were bought by members.

Since 1926 forestry club enrollment has grown from 105 to 1,384, and during this period nearly 6,000,000 trees have been planted, 98 per cent of which have been successful. Planting was done this year in 41 counties.

## Growth Rates of Pines at Ohio Experiment Station

Results of a study of the growth rates of five species of pines growing in the Wooster Forest, Ohio, under conditions typical of many old field planting sites in the State are recorded by the Ohio Agricultural Experiment Station in its annual report for 1930-31. Of the 41 species and varieties of pines grown in this forest, those which have proved to be of most importance for reforestation work in Ohio are red pine (*Pinus resinosa*), white pine (*P. strobus*), Scotch pine (*P. sylvestris*), ponderosa pine (*P. ponderosa*), and Corsican pine (*P. nigra poiretiana*). Other plantings of these species in Ohio have shown even higher rates of growth than those attained at Wooster.

The age of the trees given in the following table is the number of years which have passed since their planting in the Wooster Forest, at which time stock was 4 to 6 years old; as may be noted, all plots shown are not the same age. The trees are uniformly spaced 6 feet by 6 feet, and each plot is composed of a single species with the exception of one in which red and white pines are mixed alternately in the rows.

	Age from planting	Average height	Average diameter	Trees per acre	Volume per acre	Average annual height growth	Average annual diameter growth
	Years	Feet	Inches	Number	Cu. ft.	Feet	Inches
White pine.....	18	30.22	5.74	608	1,595	1.68	0.31
Red pine.....	17	21.47	3.90	1,180	1,051	1.26	.23
Scotch pine.....	18	31.69	5.17	840	2,070	1.75	.29
Ponderosa pine.....	17	19.30	3.77	1,129	902	1.13	.22
Corsican pine.....	15	31.27	4.45	1,180	2,068	2.08	.30
White pine <sup>1</sup> .....	15	25.50	4.09	349	436	1.70	.27
Red pine <sup>2</sup> .....	15	24.70	4.69	572	870	1.65	.31

<sup>1</sup> Grown in mixture with red pine.

<sup>2</sup> Grown in mixture with white pine.

The Corsican pine shows the most rapid annual height growth, but this advantage would be more than offset on many sites by its restricted soil requirements. Scotch pine also shows a high growth rate. Red pine, although having a somewhat lower growth rate, has other qualities, such as hardness, adaptability to a wide variety of soils, and good growth form, which make it a very desirable tree for reforestation purposes in Ohio. As the plot of mixed red and white pine indicates, the red pine seems to thrive better in mixture with certain species than in pure stands; this is especially true when it is grown in mixture with Norway spruce.

Since these data are on comparatively young stands, the results should not be considered as applicable to older stands until further information is obtained.

## Signs on Infected Trees Tell Story of Blister Rust

A graphic demonstration of the damage being done by blister rust to white pines in New York State is to be seen by travelers on the road to Ticonderoga. Infected trees on the property of O. C. Benjamin, Clemons, N. Y., have been labeled by the exhibit specialist of the State conservation department, George E. Stevens, so that motorists can see, without stopping, the devastating effects of the disease.

Yellow placards on infected trees state "Blister rust is killing this white pine," while on trees already dead the signs proclaim "Blister rust has killed this white pine." Tags have also been placed on near-by gooseberry bushes calling attention to their function as host to the blister rust. Posters describing control measures for the disease and inviting requests for further information are placed on the area, and a box conveniently located contains pamphlets on the subject.

An extension course in lumber to be given at the University of California is sponsored by the Hoo Hoo Club of Oakland, Calif. Emanuel Fritz, professor of forestry at the university, will conduct the course, which will probably begin in October. An enrollment fee of \$1 and a tuition fee of \$6 for each semester of 15 hours will be charged. The instruction will be along lines of practical interest to lumbermen, the subjects announced including physical properties of wood, methods of seasoning, and types and causes of defects.

A goal of 1,000,000 forest trees to be planted in 1932 as bicentennial memorials to George Washington has been established by 4-H clubs of Ohio. Half that number has already been planted, and Extension Forester F. W. Dean expects that the other half will be set out by club members during the fall planting season.

## North Carolina Demonstration Tours Bring Results

So successful has been the farm forestry demonstration work of R. W. Graeber, extension forester of North Carolina, that one of the several county-wide tours which he conducted this summer was attended by foresters from two other States who came to observe his methods. State Forester H. A. Smith and N. T. Barron, assistant State forester, of South Carolina, DuPre Barrett, extension forester of Georgia, H. Y. Forsythe, district forester at Aiken, S. C., and W. C. Hammerle, district forester at Spartanburg, S. C., accompanied Mr. Graeber on an all-day tour of Gaston County which included an inspection of four farm-

woods thinning operations, a timber estimating contest, a dinner given by the Kiwanis and Rotary Clubs of Belmont, N. C., and visits to successful plantations of shortleaf, loblolly, and longleaf pines belonging to R. L. Stowe, chairman of the Gaston County board of supervisors.

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"Forest Planting on the Farm," by S. N. Spring and C. H. Guise, Cornell Bulletin E-226, which tells of the different kinds of trees suitable for planting in New York State and how and where to plant them, may be obtained free from the office of publication of the New York State College of Agriculture, Cornell University.

# Forest Service Notes

## Spiral Grain Tends to Cause Warping in Sand Pine Lumber

By BENSON H. PAUL, U. S. Forest Service

Prevalence of spiral grain in sand pine (*Pinus clausa*) from the Ocala National Forest, Fla., suggested the possibility of a relationship between the presence of spiral grain and the excessive warping which has been reported in lumber cut from this species. Studies made at the Forest Products Laboratory confirmed this suspicion by showing a strong tendency for spiral grain to cause warping in sand pine lumber and in addition indicated a method of drying which may prevent most of such warping.

In making the tests at the laboratory, measurements were first made of the spiral of the grain of fifteen 2-foot bolts, cut from different trees. In three-fourths of the bolts the spiral was more than 1 inch per linear foot and in one-third a spiral of more than 2 inches per linear foot occurred. The maximum spiral found was 3.2 inches per foot of length. The spiral was then measured on slabs from eight sand pine logs, of which two were 7 feet 4 inches long and six were 4 feet long. Spiral grain in these logs ranged from 0.75 to 2 inches per foot of length.

In the test to establish relationship between spiral grain and warping, the eight logs already measured were slash sawed into 1-inch boards and the boards numbered in sequence, dressed to three-quarters of an inch thickness, edged, and the ends sawed off squarely. The lumber was divided into two lots, alternate boards from each log being taken in the order of sawing, and the lots placed in a kiln for drying. One lot was carefully piled on stickers and the boards weighted down with about 700 pounds of iron. The boards of the other lot were stacked on top of the first and so

piled that the individual boards carried no weight and each piece could warp without restriction during the drying process. The lumber when put into the kiln contained about 50 per cent of moisture, based on its weight when oven-dry, and was dried to an average moisture content of 7.4 per cent. (For commercial use it would be unnecessary to dry sand pine to a moisture content below 12 per cent.)

Following the drying, the amount of warp in each of the loosely piled boards was measured by holding a corner of one end of the board firmly against a level base and recording the deflection from the level surface at the diagonally opposite corner of the board.

In the boards held in place during drying warp was greatly reduced, and even after the weights were removed and the lumber exposed to atmospheric conditions for a period of 10 weeks no excessive warping occurred, although the moisture content of the lumber increased to 12.3 per cent. This would indicate the possibility of preventing most of the warping by the use of weights while drying. In a tall pile the weight of the lumber itself would tend to hold a large portion of the boards flat.

The warping in the loosely piled lumber, measured immediately after drying, averaged 2.20 inches for the longer boards and 1.68 inches for the shorter boards, on the basis of a board 6 inches wide. The narrow boards cut near the outside of the logs warped more than the wider boards which were cut through the central portion. This was to be expected since the inner boards have a smaller slope of spiral and are more nearly quarter-sawed, both factors reducing the amount of warping. The logs which showed the most spiral showed also the greatest warping.

During the subsequent 10 weeks of storage the warp in this lot of boards decreased somewhat, but the average amount was still four to eight times that of the

boards held down by weights during kiln-drying. At a moisture content of 12.3 per cent the average warp was 1.79 and 1.18 inches, respectively, for the long and short boards loosely piled during drying, and only 0.19 and 0.29 inch, respectively, for the long and short boards held in place by weights.

## National Forest Created in Green Mountains

A new national forest was established by proclamation of the President on April 25, 1932, and designated the Green Mountain National Forest. The purchase of only 31,228 acres within the area in the State of Vermont described by the proclamation has so far been authorized by the National Forest Reservation Commission, but when completed by expected additional purchases the new forest will contain nearly 100,000 acres on the eastern and western slopes of the main Green Mountain Range. These lands are located in a picturesque and rugged region in Rutland, Windsor, Windham, and Bennington Counties. For the present the forest will be administered by officers of the White Mountain National Forest.

## Pinus Peuce—Balkan or Macedonian Pine<sup>3</sup>

By W. A. DAYTON, United States Forest Service

Increasing interest in the growing in this country of *Pinus peuce* as a substitute for *P. strobus* because of its reported immunity from or high degree of resistance to the white pine blister rust suggests the desirability of adopting as soon as possible a standard English name for the species.

In Standardized Plant Names, *Pinus peuce* is called Macedonian pine; the name Macedonian white pine is also in use. Balkan pine seems to me a more suitable name, since this is essentially a species of the Balkan Mountains and Balkan Peninsula. There are, it is true, perhaps as many as nine different pines occurring naturally in the Balkan Peninsula besides *Pinus peuce*. These are Aleppo pine (*Pinus halepensis* Mill.), *P. heldreichii* Christ (perhaps only a synonym of *P. leucodermis*), graybark pine (*P. leucodermis* Ant.), mugho pine (*P. mugo mughus* (Willd.) Zen., syn. *P. montana mughus* Willd.), shrubby Swiss pine (*P. mugo pumilio* (Willk.) Zen., syn. *P. montana pumilio* Willk.), Austrian pine (*P. nigra austriaca* Aschers. & Graebn.), cluster pine (*P. pinaster* Ait., syn. *P. maritima* Poir.), Italian stone pine (*P. pinea* L.), and Scotch pine (*P. sylvestris* L.). It should be noted, however, that three of these (*P. halepensis*, *P. pinaster*, and *P. pinea*) are essentially Mediterranean and coastal species, *P. heldreichii* is (so far as known) confined to Albania and Mount Olympus, the occurrence of the northern *P. sylvestris* in the Balkans is still uncertain, while *P. nigra austriaca* reaches the Balkan Peninsula only on its extreme northwestern

fringe and is not truly a Balkan species. While the two varieties of *P. mugo* mentioned occur in the Balkan region they are, as is the species, admittedly more typical of the Swiss Alps and of central rather than southeastern Europe. *Pinus peuce* is the one outstanding indigenous pine of the Balkan Mountains and the Balkan Peninsula, and, so far as known, is found naturally nowhere else. Balkan pine, therefore, would appear to be a more appropriate name for it than Macedonian pine.

Another objection to the term "Macedonian" is that the exact connotation of Macedonia is obscured by the more or less kaleidoscopic changes in the boundaries of that region which have occurred from the days of Philip and Alexander to our own time; the Balkan region is fixed topographically and is more permanent geographically. Finally, Macedonian is a pentasyllabic word; Balkan has the advantage of being three syllables shorter.

Dr. Frederick V. Coville, botanist of the Bureau of Plant Industry and a member of the American Joint Committee on Horticultural Nomenclature which is at present preparing a second edition of Standardized Plant Names, tells me he approves my recommendation and will advocate the use of Balkan pine for *Pinus peuce* in the new edition.

## Improved Nail Invented by Forest Products Laboratory

A new type of nail treatment intended to increase the strength of nailed wooden joints has been invented at the Forest Products Laboratory, Madison, Wis. The new treatment is accomplished by chemical means and results in minute pitting or etching of the nail surface which causes a very high frictional contact with the wood fibers for a given weight of nail.

The improved nail is intended for use where there is need for increased resistance to lengthwise or sidewise pull. The holding power developed may range from two to three times that of a similar untreated nail, and its advantage over the ordinary type of cement-coated nail is also marked. Unlike a coating, the pitted surface will not rub off in handling or driving the nail. When redriven after being pulled out of a piece of wood the nail shows as high a resistance to withdrawal as when first driven.

A patent, to be dedicated to the free use of the people of the United States, has been applied for on the new nail treatment.



Receipts from the national forests for the fiscal year ended June 30, 1932, were \$2,294,247, less than half the amount collected in the preceding year. The receipts, derived from timber sales, grazing fees, and other uses, amounted to \$4,993,320 in 1931 and \$6,751,553 in 1930.

## National Forests Renamed

In order to avoid the confusion arising from the similar designation of a national forest and a national park in the same region, the names of two national forests have been changed by Executive order. These are the Shenandoah and Crater Forests, whose names conflicted with those of the Shenandoah and Crater Lake National Parks. The Shenandoah, in Virginia and West Virginia, has been renamed the George Washington, and the Crater, in Oregon, becomes the Rogue River National Forest.

The George Washington Forest was chosen as a memorial to the first President because of its location in a region with which he was familiar and which he in part surveyed. The tract stretches for nearly 100 miles along the summit and slopes of the Shenandoah Mountains and for some distance along the Massanutten Range, and supports extensive stands of timber. It constitutes an important part of the drainage area of the Shenandoah and Potomac Rivers and is being developed for increasing recreational use.

The California National Forest, also, has recently received a new name by Executive order, becoming the Mendocino Forest. This name is historic in the northern California region where the forest is located, having been given in 1543 to a prominent cape on the north California coast by the explorer Cabrillo in honor of Antonio de Mendoza, a governor of Mexico.

Another recent Executive order consolidates the Toiyabe and Nevada National Forests, the lands in the former being transferred to the Nevada.

## Customers Cut Their Own Wood on the Nebraska Forest and Reduce Thinning Costs

Thinnings in the older plantations on the Nebraska National Forest are being done by the local residents, who receive the wood in return for their labor. On the basis of the cost of experimental thinnings by permanent employees, the equivalent of \$33.60 worth of work per acre was performed by the applicants for wood on 84 acres during the winter of 1931-32, while the cost of marking and supervision by the forest officers was less than \$4 per acre.

The Nebraska National Forest was established in 1902 for the purpose of accomplishing two things: To demonstrate that trees could be successfully grown in the sand hills of Nebraska which are obviously unsuitable for growing farm crops; and to furnish a local permanent source of timber and wood products for the citizens of a region naturally devoid of trees. There are 11,199 acres of sand hills within the Nebraska Forest successfully planted to trees to prove the first point, and about 1,250 additional acres are being afforested annually. In some of the older plantations

the time arrived in 1929 when the struggle for existence between the trees became serious, and to maintain maximum growth some trees had to be removed. Here was an opportunity for people living near the forest to obtain wood for use as fence posts and fuel. The thinning was done by ranger labor and the wood sold, but when the cost was computed the resulting addition of \$30.56 per acre to the investment was greater than the final product could carry. The demand for wood from the forest was increasing, more thinning was needed, and finally the idea of exchanging the product for the labor was evolved.

Those desiring to obtain wood by cutting it in the forest are given permits with simple requirements. Trees to be cut or pruned are marked by forest officers, and certain areas are assigned to each permittee. It was found that many of the applicants had already examined the plantations and selected the areas in which they wanted to work.

One of the requirements is that all slash resulting from the cutting and trimming of the trees must be scattered evenly over the surface of the designated area except that every fifth lane, or strip of land between adjacent rows of trees, must be kept clear. Research experiments have shown that slash left on the ground after thinning increases the fertility of the soil and helps keep down the grasses which tend to come in and are a greater fire hazard than the slash. Leaving these lanes clear of all slashing is primarily for fire suppression purposes. They are also useful as skid trails in removing the wood.

The permittees take pride in the cutting work and try to follow requirements to the letter, some going even a step or two further. One man found that he could avoid injuring the bark on trees growing in the skid lanes by placing burlap around the butts. Another took such extreme care in pruning that the scars where limbs had been removed looked as though they had been polished.

## Timber Retreats When Man Mistreats

By A. E. WIESLANDER, United States Forest Service

Steadily, though slowly, the ponderosa pine belt in Eldorado County, Calif., is being pushed back and up the Sierra slopes. Because of man and his occupation of the land, there has been a retreat from the 1,000-foot to the 2,500-foot level on a 30-mile front, a distance of nearly 10 miles, leaving a deforested area of 162,000 acres. In addition there is an area of second growth nearly as large, three-fourths of which is less than half stocked. And this condition is typical not only of the entire western front of the pine belt in the Sierra Nevada but of the Douglas fir belt of the California coast ranges.

The change from forest to deforested land has come about very gradually. Most of the present residents

of Eldorado County do not know that the region was ever timbered. But a recently completed survey of the natural vegetation of Eldorado County discloses indisputable proof of the former occupation of this land by pine. Scattered relict individuals and groups of ponderosa pines bear mute evidence of former forests, as does also the presence of the California black oak, which invariably grows with this species at its lower limits and survives by sprouting when the pine succumbs to the ax and fire. Several instances were found where the boundary line between second growth and nonforest cover coincided with property-line fences, and the cemeteries of Eldorado and Frenchtown have preserved excellent second-growth pine stands. Some of the deforestation may be attributed to the Indian, but undoubtedly the larger part has occurred since the advent of the white man, whose first inroad probably began with the establishment by Capt. John Sutter of a sawmill at Coloma. In this mill race, gold was first discovered in January, 1848, by James Marshall. The feverish mining activity which followed gave great impetus to lumbering, and by 1855 the first official record shows a total of 39 sawmills in the region. For the next decade 35 to 40 sawmills were constantly in operation. Such names on the map of the county as Sawmill Creek, Sawmill Ravine, and Shingle Springs testify to the lumbering activities of that period. By 1870 the lower ponderosa pine belt had been largely logged off.

What use has been made of this land? In 1863 as much as 31,000 of the 162,000 acres was under cultivation. With the decline of mining much of this, too steep or too infertile to farm, was abandoned. The land still cultivated constitutes about one-tenth of the area; two-fifths of it, covered with grass and grassy woodland, is now used for grazing; while practically half is scrub woodland, worthless for timber and too dense or too brushy for good grazing.

This deforested, uncultivated land, now worth little to anybody, would have come back to pine timber except for the many fires, accidental and willful, which have occurred. The prospector set fires to expose gold-bearing outcrops concealed by the young timber growth. The present owner of foothill land, seeing no present or prospective market for second-growth timber in his generation, believes that the only possible financial return is from grazing and accordingly makes fall burning an annual practice. By this means he hopes to increase forage and remove inflammable material, thus preventing the dangerous summer fires which threaten his forage supply, stock, fences, and buildings. Temporarily, fires may give him grass, but the ultimate outcome is an impoverished soil supporting only the worthless brush and scrub trees. As a further means of replacing timber with grass, he cuts or girdles remaining trees. That it requires from 12 to 28 acres of this burned-over, deforested land to feed one cow for an 8-month period is significant.

Contrast the present use of this land with its timber-producing potentialities, shown in the following table by site index and corresponding yield per acre in 60 years if fully stocked:

Site index	Per cent of area	Productive capacity in 60 years
		<i>Board feet per acre<sup>1</sup></i>
50	22.8	24,000
60	52.6	35,000
70	20.7	50,000
80	3.4	69,000
90	.5	88,000
	100.0	<sup>2</sup> 37,018

<sup>1</sup> By the international rule ( $\frac{1}{8}$ -inch kerf).

<sup>2</sup> Weighted average.

Site index, or the height attained by the average second-growth trees at 50 years of age, is the measure of the productiveness of land for growing timber. It was possible to ascertain the growth capacity of the 162,000 acres of deforested land by measurements of the height and age of hundreds of the relict second-growth trees. The possibility of such excellent timber yields from low-value grazing land points to the desirability of reforestation.

The situation in Eldorado County is only an aggravated example of what has happened in many forest areas with somewhat similar history. A grave national problem of land use is presented by lands now practically useless which are capable of producing again, as they once did, valuable timber.

## Natural Areas and Experimental Tract Designated in National Forests

A tract of 1,176 acres of wild land within the Chippewa National Forest in Minnesota has been set aside by the Forester as the Pine Point Natural Area. In accordance with established policy, characteristic plant and animal life on this tract will be preserved, so far as practicable, in an unmodified condition. The area contains a typical stand of virgin pine which is more nearly in its natural state than the timber on any other part of the Chippewa Forest. In general, the merchantable timber is represented by Norway, white, and jack pines, white birch, and red oak. Aspen is closely associated with pine as the result of the last fire, which occurred about 35 years ago. Historically, the region is connected with the pioneer period of national development. Chippewa Indians are still the principal inhabitants, the population of the nearest settlement, Onigum, known as the Indian Agency, about 2 miles south of the natural area, consisting of about 75 Indian families. Indian allotment lands adjoin the national forest, occupying a portion of Pine

Point, and the forest is used by the Chippewas for hunting and fishing. Such use of the natural area by them will not be restricted.

Another area set aside under the same regulation is a tract of 1,000 acres in the Inyo National Forest, Calif., to be known as the Indiana Summit Natural Area. Located on the slopes of Bald Mountain at an elevation of 8,000 feet, 6 miles south of Mono Lake, this area contains a typical virgin forest of Jeffrey pine in which no lumbering has ever been done. None will hereafter be allowed, and the region will be maintained in its natural state.

A new experimental forest area, to be known as the Parker Creek Experimental Forest, has been withdrawn from the Tonto National Forest in Arizona. Here the Southwestern Forest and Range Experiment Station will conduct studies in erosion and streamflow, with special emphasis on the relationship of grazing to water. The tract of 1,790 acres lies in the drainage of the Roosevelt Reservoir; the vegetation is mostly brush, with some grass and timber.

## Factors in the Natural Distribution of Tree Seed

Reporting on experiments in which he used seed of many tree species, the late Howard W. Siggins, associate silviculturist at the California Forest Experiment Station, wrote:

Any group of seeds liberated from one tree at the same instant will tend to be distributed in a straight line to leeward of the tree. If all seeds produced by a tree were to be released at one time this would result

in an undesirable concentration of seeds in a limited area and a total lack of seeds in other areas. Nature has guarded against any such wasteful process. A pine cone, for example, opens one scale at a time. As the scale opens the two seeds which were borne under it are permitted to drop out. Ordinarily several days elapse between the escape of the first and last seeds from any one cone. Furthermore the cones on different parts of the same tree do not all open at the same time. One tree may be casting seed for several weeks. Variations in direction and velocity of the wind during this period result in widespread scattering of the seeds. Where the winds are rather consistently from one direction the area seeded will be in the form of a V with the apex at the base of the tree. The areas of the concentric radial zones increase as the squares of the radii. The greatest number of seeds per square foot of ground will therefore be found quite close to the base of the tree. The concentration of seeds will then decrease rather gradually with increasing distance from the tree until the point is reached where the average seed is dropped by the wind of average velocity. Beyond this point the concentration of seeds will diminish very rapidly.

A forester who wishes to plan carefully the distribution of seed trees on a cut-over area must consider not only the velocity but also the variability of direction of winds which are to distribute the seeds. The ideal condition would exist when winds might be expected to blow from all directions. Each tree would then stand in the center of a circle and would seed the maximum area without overlapping. Where the prevailing winds come principally from one direction, however, the seed distribution will be in long narrow Vs and considerable overlapping will be necessary to provide for completely covering the ground \* \* \*.

Under certain unusual conditions tree seeds may be carried for many miles. Possibly this may not occur with one seed in a million, but the fact is of great interest to the dendrologist in explaining the occurrence of scattered specimens far from seed trees.

# General Forest News

## Pine Beetles Killed by New Method

By F. P. KEEN, Bureau of Entomology, and FRANK SOLINSKY,<sup>1</sup> National Park Service

More effective and cheaper methods of killing pine beetles are constantly being sought by entomologists and foresters who have to deal with these destructive timber pests. The use of oil by the United States Forest Service in national forest regions 1 and 4 in burning the bark of standing or felled lodgepole pines infested with the mountain pine beetle led to the adaptation of this method in treating infestations in the Crater Lake National Park. After many trials with different oils, equipment, and modes of application, the following practice was adopted.

In the Crater Lake Park most lodgepole pines are too tall for the infested length to be burned without felling.

The trees were felled in such a position as to raise them off the ground and clear of brush and green timber. They were then limbed, and the top cut off at the end of the infestation. A small fire was started on the base of the log, a spray stream of oil directed against it, and the fire carried up one side of the bole and down the other. The log was then given a quarter turn, and the unburned sides treated in the same way. One man with a shovel followed the burner and extinguished any fire that dropped to the ground. By never allowing any ground fire to start, the escape of fire and scorching of near-by trees was almost entirely avoided. As in the similar work on the national forests, it was considered that the log had been adequately burned when the bark scales showed white ash margins. Within 5 or 10 minutes the fire was completely out, only the bark was scorched, and the beetles were killed.

The burning equipment used in the project consisted of a 5-gallon back-pack pump, similar to the standard pump required for fire protection, fitted with a 3-foot

<sup>1</sup> In charge of insect control, Crater Lake National Park.

extension and a nozzle designed to vary the character of the oil stream. Several 5-gallon cans were necessary for transportation of oil to replenish the pump. Ordinary fuel oil with a gravity of 27 and a flash point of 225° F. was found to be the most satisfactory both from the standpoint of slowness of burning and cost.

It was found that five men made the most economical size of burning crew—two fallers and three burners. The burners interchanged positions, alternately burning, extinguishing fires, and packing oil in order to equalize the burden of the various jobs. The cost of the project varied from 68 cents to \$1 per tree, depending upon the thickness of the ground cover, the extra fire precautions which had to be taken, the distance from the oil supply, and the ability of the crew to adapt the method to each particular situation. At about 5 cents per gallon, the cost of the oil used per tree was almost negligible, one-half to three-fourths of a gallon being sufficient.

In places where the stand is open and the trees are relatively short and have thin bark, the burning-standing method of beetle control can be used. It can probably be used in Crater Lake Park to good advantage in the treatment of short, thick, and knotty whitebark pines which are very difficult to fell and peel.

The oil-burning method was also tried by national park officers in the treatment of ponderosa pine infested with the western pine beetle. When the amount of oil used on the stems of felled trees was increased the bark and cambium layer became so hot as to burn one's hands when touched, and all of the beetles in and under the bark were killed. The results were so successful and the cost so greatly reduced in comparison with the old hand-peeling and burning that the method may find an important place in the control of the western pine beetle in ponderosa pine as well as in combating the mountain pine beetle in lodgepole pine stands.

## Oldest Pine Plantation in the South Found in Georgia

By W. R. MATTOON, United States Forest Service

Where is the oldest planting of southern pines? For the past 10 years it has been supposed that the shortleaf pine plantation near Griffin, Ga., was the first, but recent investigations show that this grove is after all not the oldest, though Georgia apparently still holds the record.

Among the low hills about 8 miles south of Augusta, Ga., just west of the Savannah River flats, is the old and well-known Windsor Spring, which flows a large stream of cold sparkling water. Here 4 acres of shortleaf pines stand in regular rows. The annual rings tell the story that they are 64 years old and were probably planted some time between 1870 and 1872, when they were 2 to 4 years old. No definite record of the planting of the pines has been found, but since

it is known that the land was owned at that time by Adam Johnston, a planter and manufacturer who lived there until his death in 1895, it is probable that they were planted by him. The trees are now spaced approximately 20 feet by 20 feet in regular rows. In height they vary from 60 to 85 feet, with an average height of 73 feet. In diameter at breast height the trees range from 14 to 25 inches, with an average of 16 inches. Because of the rather wide spacing for shortleaf pines during the first 25 years or so, the trunks are somewhat roughened by knots which mark the location of former branches.

The trees are mostly shortleaf pine (*Pinus echinata*) with a few loblolly pines (*P. taeda*). The area of the present plantation is about 4 acres, but the original acreage has clearly been decreased by cutting new roads, and probably also by opening up one or more fields for cultivation.

## Some Effects of Drought

Effects of the drought of 1930 on pine and swamp forests in Minnesota, with particular reference to the Chippewa National Forest, were made the subject of a survey by Hardy L. Shirley, of the Lake States Forest Experiment Station. He found that young growth suffered most severely, the mature trees of all species escaping with no noticeable damage. Of the pines, jack pine was most susceptible to injury, and losses were heavy for young black spruce seedlings rooted in the upper layers of moss in the swamp forests. Losses in aspen were comparatively light.

Counts of 1930 seedlings made on a large number of sample plots showed that only a few survived the summer, and these were all on artificially prepared seed spots. Plantations established as early as 1925 and 1926 sustained losses of 30 to 50 per cent. This was probably not excessive, however, in view of the deficit in precipitation, which for the year 1930 was 5.15 to 10.9 inches below the annual average of 25 inches at weather stations in and near the Chippewa Forest.

Drought losses in pine forests decreased in severity with increasing height and density of reproduction. For areas with a stocking of 10,000 trees per acre losses were only about one-tenth as great as on areas with fewer trees. Poorly stocked stands which could least afford losses suffered most severely from the drought.

The theory that large trees tend to deplete soil moisture and that consequently the forest presents unfavorable conditions for plant survival during periods of drought was not borne out by Doctor Shirley's findings. The unfavorable influence of the root competition of older trees was more than offset by the beneficial effects of their shade. This was due to the protection afforded by the upper canopy against excessive transpiration which, when added to depleted soil moisture, causes much of the fatality among the smaller



vegetation. It would seem therefore that in regions where droughts are likely to occur adequate shade should be maintained until reproduction is sufficiently advanced to withstand high transpiration, after which it is no longer beneficial and should be cut or thinned out.

In contrast with the above conclusions, C. E. Behre, director of the Northeastern Forest Experiment Station, in noting the effects of drought on transplant beds of white pine and Norway pine at Cornwall, Conn., in the summer of 1929, found that density, instead of decreasing losses, increased them. The transplanted seedlings were 2-0 stock set out in the spring of 1928, those in one bed of each species being spaced at 3-inch intervals and those in another bed at 1½-inch intervals. The closely spaced white pines were almost all killed by the drought and approximately 30 per cent of the dense Norway pines died, while the seedlings of both species in the 3-inch beds suffered practically no losses.

These observations are not, however, entirely inconsistent with those made in Minnesota, since in the case of the Connecticut transplant beds there was no overhead shade whatever. The mutual protection afforded by dense growth could not overcome the disadvantages of greater competition for soil moisture.

## New Tree Disease Active in New York

A disease which attacks white and red pines has made considerable headway in plantations owned by the city of Rochester, N. Y., on Hemlock and Canadice Lakes in southwestern Ontario County and also in white pine plantations of the Norwich Cemetery Association at Norwich, where it was first noticed in 1928. About 40 acres of the Rochester plantations are affected by it. Harlan H. York, investigator and consultant forest pathologist of the New York State Conservation Department, is conducting studies of the disease, which appears to be caused by a fungus, as yet unidentified, operating on the base of the tree trunk and the adjacent portions of the roots.

A profuse exudation of resin at the base of the trunk, which permeates the soil for several inches around the tree, is caused by the disease through enlargement and breaking down of the resin pores in the inner bark and in the wood. It is considered possible that the infection may spread through the ground, as living trees surrounding one killed by the disease were all found to be infected. Trees live three to five years after being attacked.

Theories as to the cause of the trouble have so far been proved negative by the investigation. It is thought that it may be of foreign origin, in which case, says Doctor York, "its history may be found to be similar to that of other plant diseases introduced into this country from abroad, which have had a period of slow development of several years, followed by great activity when the fungus becomes adapted to its new environment."

## Effectiveness of the Burning-Standing Method of Barkbeetle Control

By JAMES C. EVENDEN, United States Bureau of Entomology

To determine the effectiveness of the charring of the bark of standing trees as a means of controlling outbreaks of the mountain pine beetle (*Dendroctonus monticolae* Hopk.), a study was conducted by the Bureau of Entomology in the Wyoming National Forest where this method was being practiced in lodgepole pine stands. The infested trees were sprayed with an inflammable oil and then burned, the oil being applied by small pressure tanks which can throw it to a height of 26 or 28 feet with the aid of a 6-foot pipe extension. All trees that could not be burned to the height of the infestation were felled and treated.

In studying the results of the project a large number of trees, selected as representative of the area, were felled and examined. Some of those already felled were also examined for additional data. Conclusions reached were as follows:

In order to destroy the insects beneath it, it is necessary to burn the bark so severely that the edges of the bark flakes turn white.

It is impossible to determine from the ground the actual height of the infestation in standing trees.

The existence of a relationship between the average height of infestation and the diameter of the bole is evident. In the larger and taller trees the broods reach a greater height.

Infested trees occurring in groups are likely to be infested to a greater height than single trees.

Trees with heavy basal attacks show higher average infestations, while trees with one-sided attacks seldom have very high infestations.

Treatment of trees to a 7-inch top diameter will destroy 99.7 per cent of the infestation; to an 8-inch top, 98 per cent; and to a 9-inch top, 95.3 per cent.

The treatment as conducted on the Wyoming National Forest was 96.1 per cent effective; if no trees had been felled for treatment it would have been 90 per cent effective. A straight burning-standing method of control, therefore, would seem to be an economical procedure where funds are limited, since by this means the greatest number of insects may be destroyed for each dollar expended; but to effect a complete clean-up of an infestation all trees which can not be burned to a 7 or 8 inch top diameter should be felled for treatment.



Sitka spruce, the largest of the native spruces of Canada, because of the uniform structure of its long, straight fibers and their even distribution through the wood, possesses an unusual quality of resonance. It is much utilized in the manufacture of piano soundboards, parts of other stringed instruments, and organ pipes.

## The Copeland Resolution

In response to Senate Resolution 175, proposed by Senator Copeland, of New York, March 2, 1932, and adopted by the Senate on March 10, the Secretary of Agriculture, through the Forest Service, is preparing for submission to the Senate when it reconvenes a report which will cover the whole national forestry problem and suggest a constructive program for its solution. The text of the resolution follows:

Whereas the consumption of the forests of the United States has progressed to a point at which their early exhaustion is threatened; it being estimated (1) that over 50 per centum of all the softwood lumber cut in the United States has been cut during the last thirty years, (2) that, with a population almost 60 per centum greater to-day than at the beginning of the twentieth century, the United States has been using nearly three hundred billion feet of softwood lumber alone during each decade since 1900, (3) that in 1928, with a population of more than one hundred and twenty million, the annual cut of softwood lumber alone was twenty-eight billion feet, and (4) that there now remain in the territory east of the prairies, only about twenty-five billion feet of original timber; and

Whereas there are great areas in the United States, which, aside from their underlying minerals, are suitable for forestation only; it being estimated that of the great land area constituting the thirteen Northeastern States, from Maine to and including the two Virginias, about one-half, or seventy-five million acres, are suitable for forestation only; and

Whereas proper utilization of such lands as a public domain under proper control, would to some extent effect a modification of the climate, substantially effect or control the run-off of water, supply a cheap and dependable supply of lumber, and, through development, with roads, camping places, leased hunting and fishing rights, and other opportunities for social activities, would afford valuable resources for entertainment and improvement in national health, besides giving wealth-producing and steady employment to a large number of persons; and

Whereas it is desirable (1) that a coordinated plan be immediately developed for the cooperation of the Federal and State Governments in the utilization of such lands suitable for forestation only, (2) that information necessary as a basis of legislation be compiled, and (3) that recommendations for legislation be made: Therefore be it

*Resolved*, That the Secretary of Agriculture be requested (1) to advise the Senate as soon as practicable whether, in his opinion, the Government should undertake to aid the States in the utilization for forestation purposes of those areas of land in the United States suitable for forestation only, and (2) to state fully his reasons for any opinion which he may submit, together with the facts upon which such opinion is based.

## Nekoosa-Edwards Plantings Show Good Survival

The Nekoosa-Edwards Paper Co., of Port Edwards, Wis., produced more than 4,000,000 forest tree seedlings and transplants in its Nepeo Lake nursery in 1931 for general planting purposes. The 1931 inventory at the company's Chippewa River nursery showed a total of 1,892,000 seedlings of such species as northern white pine, Norway pine, jack pine, and white spruce.

During the year the company planted trees on 1,896 acres of land and plowed 1,460 acres to prepare it for planting in the spring of 1932.

Survivals in the forest plantations established by this company from 1926 to 1929, inclusive, ranged from 83 to 96 per cent. Its 1930 and 1931 plantations in central Wisconsin were less successful, presumably as a result of the drought existing there in each of the two years. On about 1,100 acres, or one-third of the area planted in those years, survival was found to be less than 70 per cent. Accordingly this portion of the area was replanted in the fall of 1931.

In Ashland County, Wis., survival in Nekoosa-Edwards plantations has never gone below 85 per cent and has sometimes gone as high as 98 per cent.

## Rodents Observed at Work on Blister Rust Cankers

Several eyewitnesses have arisen to tell of rodent action on white pine blister rust cankers. Heretofore the marks of such action have been observed by many persons who did not, however, succeed in catching the animal at work. B. H. Nichols, blister rust control agent at Lewis, N. Y., states that he has often seen red squirrels busily gnawing at the cankers, and a similar statement comes from a Mr. Getchell who owns some heavily infected northern white pine at Belgrade, Me. Blister rust control agents cite instances in which a cottontail rabbit and a field mouse were seen at work on cankers. Rodent work is observed to have had some beneficial results in reducing the spread of spores.



Blister-rust infections have been found on pines in the Arnold Arboretum, according to E. M. Brockway, Massachusetts blister rust agent. An inspection of the 5-leaved pines in the arboretum made in December, 1931, disclosed two infections on white pine (*Pinus strobus*), one on western white pine (*P. monticola*), and one on sugar pine (*P. lambertiana*). A trunk canker on *P. lambertiana* was so completely caked over with pitch that it was not possible to determine with absolute certainty whether it was a blister rust canker or the work of another fungus. In May, 1932, another inspection was made and aecia were found developing in the canker, which apparently confirms its identification as blister rust.



Temporary increase in the rate of germination of red pine seed which had been immersed in alcohol for the purpose of floating off dead and empty seed is reported by Henry I. Baldwin in the American Journal of Botany. After being stored for several months, however, these seed fell below untreated ones in germination rate. A second immersion in alcohol produced regeneration of sprouting capacity, but for an even shorter period.

## Well-Fed Pines Produce More Cones

By E. W. GEMMER, United States Forest Service

An increase in fruitfulness is one of the changes observed in longleaf pines on the Choctawhatchee National Forest, Fla., during the course of soil fertilization and irrigation experiments conducted by the Forest Products Laboratory from 1927 to 1931. Different groups of pines have been treated with pine-needle mulch, with sodium nitrate, with water, with sodium nitrate and water, and with complete fertilizer and water. Concurrently with observations on summerwood formation and other features of growth, a count has been made yearly of cones produced by the trees on the study plots. The results of these counts are as follows:

Treatment	Number of trees	Number of cones produced per tree				
		1927	1928	1929	1930	1931
None.....	17	0.4	0	1.2	0	2.1
Mulch.....	6					11.0
Sodium nitrate (no irrigation).....	7	0	0	5.1	0	15.8
Irrigation.....	7	2.0	0	16.4	0.9	24.6
Sodium nitrate and irrigation.....	9	0	0	14.7	7.0	53.6
Complete fertilizer and irrigation.....	6	0	0	26.2	0	61.6

<sup>1</sup> Average for 3 trees (3 trees were killed by Ips beetles in 1930-31).

Foresters have as a rule preferred trees of more than average vigor as the source of seed to be used in producing planting stock, and in general the practice has justified itself. Apparently the factors that make possible vigorous vegetative growth likewise, in general, enable a tree to produce adequate supplies of seed. Horticulturists have recognized, however, that heavy seed production sometimes results from an overproduction of carbohydrates brought about by the withdrawal, from a tree making vigorous growth, of part of the available supply of some essential nutrient factor such as nitrates or water. The trees included in the Choctawhatchee experiments were handicapped, however, by continuous partial starvation prior to 1927. It can therefore be assumed that carbohydrates for seed production were insufficiently available. Five years' soil treatment was followed by cone production from 7 to 30 times as great as that on untreated plots. It would appear that on poor sites such as the Choctawhatchee any factor that stimulates vegetative growth increases the fruitfulness of the tree.

A 6-year-old slash pine tree 8 inches in diameter has been exhibited in Georgia as an example of the rapid growth of the species in that State. The tree was planted in a field with other slash pine seedlings in 1926; the other pines have also developed well, but this tree holds the record.

## United States to Receive Schlich Memorial Prize

Interest on a fund of £1,700 contributed by his friends to perpetuate the memory of Sir William Schlich has been awarded to the United States in 1932 by the trustees of the fund, according to notification received from J. S. Corbett, secretary of the Empire Forestry Association of London. The interest, £75, is paid each year in rotation to different parts of the British Empire and to the United States to be devoted to some purpose calculated to promote the cause of forestry. Disposal of the money has been placed in the hands of the executive council of the Society of American Foresters with authority to take such action as in its judgment will be most appropriate for the purpose intended.

William Schlich was born in Germany in 1840 and received his forestry training there at the University of Giessen. In 1867 he accepted a position in the Indian Forest Service. He held several successive posts in that service until in 1881 he was appointed Inspector General of Forests in India. In 1885 he went to England to inaugurate forestry work at Coopers Hill College, and 20 years later was called to Oxford University to organize a school of forestry there. In 1909 he was knighted for his services in India. At the time of his death, in 1925, he was still professor of forestry at Oxford. He is best known in this country for his 5-volume "Manual of Forestry," for many years the standard work on forestry in English.

## Planting Tray for the 1-Man Crew

A receptacle in which the 1-man planting crew can conveniently carry his own supply of little trees is a galvanized iron tray designed by E. O. Ehrhart, forester for the Armstrong Forest Co., of northwestern Pennsylvania. The tray has a 10 by 15 inch base, 4-inch sides, and an upright handle of  $\frac{3}{4}$ -inch strap iron rising 12 inches above the base. To make the grip comfortable a  $\frac{3}{4}$ -inch galvanized iron pipe is stripped over the crossbar of the handle. A support that holds the trees in a semierect position has been provided by making one end of the tray slope outward at an angle of about 45°. This sloping end is of galvanized sheet steel. Joints are soldered and riveted.

Trees recently found growing on the slopes of the Venezuelan Andes by a Carnegie Institution expedition belong to the same family as those which once flourished in California and Oregon, according to comparisons with fossil leaf prints found in rocks of the Pacific Coast region. The discovery fits in with the theory that the ancient forests of western North America were pushed south by increasing cold and dryness of the climate.

## Foreign Notes

### Southern Pines Promise Success in South Australia

Under an afforestation program begun in 1923, the Woods and Forests Department of South Australia had planted with conifers 31,401 acres of the 271,518 acres of State forest land at the end of 1930, according to the report of the conservator of forests of South Australia for 1930-31. *Pinus radiata* predominated among the species planted.

In the State tree nursery maintained by the department experiments are being made with exotic pine species with the following results:

With regard to the introduction of the conifers from the Southern States of the U. S. A., namely, *Pinus caribaea*, *palustris*, and *taeda*, this promises to allow of the utilisation of areas where it has not been found possible to grow *radiata*, particularly with reference to the swamp lands for *caribaea* and the deep sands for *palustris*, as, within the various tracts being afforested, there are large areas comprised of these two classes where even *pinaster* has not succeeded. It has been pleasing to note the exceptional growth of *Pinus caribaea* (slash pine) planted on both mound ploughing in swamps and on ploughed lines just off the swamp. Planted as seedlings some 6 to 8 inches high, they are now after 12 months' growth 18 to 36 inches high, with strong thick stems.

*Pinus taeda* and *Pinus palustris* are also flourishing and give every indication of complete success. Two new species—*Pinus luchuensis* and *Pinus insularis*—have been sown in the nurseries and are so far thriving well.

It has been observed that up to the present rabbits have avoided *Pinus caribaea*, even in areas where destruction has been heavy on other species of conifers.

Experiments in a small way are being conducted with *Pinus insularis*, which, during its nursery stage in open beds, looks promising.

The germination of locally collected seed of *Sequoia sempervirens* (California redwood) procured from fine healthy trees at the National Park, Belair, and the quality of the nursery stock, is most encouraging to its establishment in this State on suitable soil sites.

### Advanced Pulping Methods Used in Swedish Mill

Methods of handling logs at Sweden's largest pulp mill, situated at Ostrand in northern Sweden, are in some respects unusual. A new type of barking drum and a novel drying machine are of particular interest. The largest sulphate mill in Europe, the Ostrand mill belongs to the Svenska Cellulosa Aktiebolaget (Swedish Pulp Company) which controls 5,100,000 acres of forest and agricultural lands in the north of Sweden.

The pulp logs are superficially barked in the forests to diminish risk of losses in transportation through

sinking in the rivers. The inner bark is removed at the mill by the new revolving drums, built for continuous barking of logs in full length. A radical change in drying methods has been introduced by the fan-drying machines. Instead of placing the pulp on the usual set of cylinders for drying, it is dried by hot air in huge cases with sides closed and insulated to prevent heat losses.

The mill has a wood yard with an area of 150,000 square yards and a capacity of over 4,000,000 logs. The logs are stored in parallel piles in such a way as to give free circulation of air to all parts. A crane and conveyor 1,000 feet long with three pairs of legs on wheels driven by synchronized motors can be easily manipulated on tracks over the whole yard and handles logs in bundles up to 10 tons in weight.

### Germany Accords First Place to Forestry in National Agricultural Celebration

In Germany's annual national agricultural exposition, known as the Grune Woche, held in midwinter at Berlin, prominent place was given this year to a forestry exhibit designed to bring to public attention the many uses of wood in German life. The exhibit is described as very effective by Joshua A. Cope, extension forester of Cornell University, who spent the first half of 1932 in Europe and attended the Grune Woche.

More than casual attention was attracted by the elaborate exhibits of commercial products of German forests, of the outstanding qualities of wood as raw material, for home building, and for furniture, and by pictures and charts showing German forests and forest work and the economic status of wood in Germany at the present time. The world economic depression, competition of foreign woods, and increasing use of substitutes have forced down the price of German forest products to such a low figure that on the program of the fair was the statement, "This is the zero hour of forestry in Germany."



The oldest industrial company in Sweden, and perhaps in the world, is Bergslaget (Stora Kopparbergs Bergslags Aktiebalag), founded in the year 1225. It started as a mining company, first producing wood for charcoal and mine timbers, later for lumber and pulp. For 700 years the company has been logging the same forests, and to-day they are better than ever. Its million acres of forest land is under systematic silvicultural management in charge of a forest staff who select and mark the timber to be cut and superintend all operations, including logging.

## League of Nations Calls Meeting of European Lumber Experts

A committee of European lumber experts, representing Germany, France, Great Britain, Italy, Finland, the Netherlands, Poland, Sweden, Czechoslovakia, Soviet Russia, and Yugoslavia, has been appointed by the League of Nations to examine the world lumber situation and to recommend remedial measures, according to a report of the assistant United States trade commissioner at Paris. A 3-day meeting of the committee was held in Vienna in June. Data will be collected by the committee on such matters as the organization of the lumber industry in the various countries, lumber export figures and their relation to the general exports of each country, statistical facilities available, and regulations governing imports and exports, such as quotas and customs duties. This information, the League hopes, will furnish the basis for the formation of a feasible plan for international cooperation to improve the condition of the industry.

## New Fire Pump Shows Promise in British Columbia Tests

Failing to find a stock fire pump for sale by manufacturers in England or America embodying certain desired specifications, the British Columbia Forest Service ordered one built in Vancouver for experimental purposes. The pump, as described by F. A. MacDonald in the June, 1932, *Forestry Chronicle*,<sup>2</sup> is of the 4-stage centrifugal type, to be operated with an Austin engine weighing 135 pounds. Of aluminum alloy construction with enclosed impellers, it weighs, with coupling, 43 pounds, and is mounted with the engine on a specially designed aluminum base.

Though not yet tested on actual fires, the pump has been operated for about 25 hours and has made a perfect record of performance. Working at 150 pounds pressure at the pump, this equipment has in actual trials thrown 78 measured gallons of water per minute through two one-half inch nozzles to a distance of 125 feet.

Mr. MacDonald lists seven advantages of the pump against two disadvantages. The latter are that the pump must be primed before starting the motor and a good foot valve attached to suction hose, and that the unit weighs about 220 pounds. This weight, however, may be offset by the pump's dependability. The good points are:

1. Engine is controlled by governor so that hose may burst, couplings come off, or changes can be made from one hose line to two or three, and the engine will not race.
2. The engine can not be unduly speeded up or raced by the operator.

3. The only wearing points in the pump are double ball-bearings and packing glands, one each at either end of the pump shaft. The rotors are not in contact with the body of the pump and consequently no loss of efficiency will arise from this cause, so common in gear pumps.

4. The higher the pressure against which the pump is working the less work the engine has to do. Gear pumps become harder to drive as the pressure increases.

5. Engine is easily started against full head of water in hose, as rotors turn freely like a flywheel in the entrained water. Any person who has tried to start a gear pump against 100 or more pounds pressure will appreciate the advantage of this feature.

6. Hose may be kinked with no resulting damage to pump or engine.

7. Water has been delivered in a fair stream at a measured elevation of 360 feet at the end of 1,100 feet of hose. On this occasion 190 pounds pressure was shown at the pump.

## Extent and Value of Japanese Forests

Forests and wild lands occupy approximately 60 per cent of Japan's total land area, and the total value of production from these lands amounts annually to about \$120,000,000, according to the recently issued statistical abstract of the Japanese Ministry of Agriculture and Forestry for 1930. During 1930 the aggregate area of forests and wild lands was 56,890,000 acres, of which 86 per cent consisted of forested tracts and 14 per cent of bare tracts.

Encouragement by the Government, local authorities, and other public bodies was probably responsible for an increase over 1929 of 0.6 per cent in the area of protection forests, which was 5,085,000 acres in 1930.

During 1930, 250,090 acres of land were afforested; 334,900,000 trees were planted, two-thirds of which were Japanese varieties of cedar, cypress, and pine; and 879,689 acres of land were cleared. The total value of wood produced during the year was estimated at \$60,000,000, of which 57.9 per cent was lumber, 39.4 per cent fuel and construction wood, and 2.7 per cent bamboo.

Miscellaneous products and nontimber crops from forest lands were valued at nearly \$48,000,000, the most important products being charcoal, coal, green grasses, mushrooms, bamboo sprouts, and wasabi.

Since the World War, and particularly since the earthquake, Japan's wood production has tended to decrease, and lumber exporting has given way to lumber importing. Large quantities of Douglas fir are now imported annually from the United States.



In connection with the Bordeaux Pine Institute of Bordeaux University, a laboratory for the study of pines, their uses, diseases, and the extraction and utilization of their resinous products has been instituted in France. The laboratory is situated in the Hermitage forest, about 15 miles from Bordeaux.

<sup>2</sup> Published by the Canadian Society of Forest Engineers, at Toronto.

# Personals

Hugh P. Baker, dean of the New York State College of Forestry at Syracuse University, who lectured at Princeton as one of a group of public speakers known as the Guild of Brackett Lecturers, has been elected a Brackett member of the Princeton Engineering Association. Doctor Baker has also been selected by the New York State Historical Association to contribute a chapter on the history of forestry in the State to the 2-volume history of New York now being prepared by the association.

T. G. Woolford has been reelected president of the Georgia Forestry Association for the coming year. Other officers are G. Ogen Persons, first vice president; Jack Williams, second vice president; J. P. Campbell, third vice president; Joseph A. McCord, treasurer; Bonnell Stone, secretary; and C. B. Harman, chairman of the executive committee.

Ward Shepard, formerly of the United States Forest Service and now in Germany, has been selected to make a study of German forestry with particular reference to its application to conditions in America under a grant for this purpose made by the Oberlander Trust of the Carl Schurz Memorial Foundation, Philadelphia.

Officers elected by the Gulf States section of the Society of American Foresters for the coming year are F. B. Merrill, State forester of Mississippi, chairman; G. H. Lentz, of the Southern Forest Experiment Station, vice chairman; and A. R. Spillers, also of the experiment station, secretary.

James L. Averell, a 1926 graduate of the Yale School of Forestry, who resigned from the United States Forest Service last year to do graduate work as Baker fellow in forestry at the University of California, spent the summer as assistant at the university's summer camp in Plumas County, Calif. He will continue his studies toward the Ph. D. degree from California University during the coming year.

G. W. Hult, formerly with the United States Forest Service in region 6 and with the Southern Pacific Co. in California, has recently entered private forestry practice with headquarters at Corvallis, Oreg. Mr. Hult spent the year 1926 in Europe, making a study of European forestry methods; in 1929 he was at the University of California doing research work in the field of forest management and economics.

Fred Kennedy, junior range examiner, has been transferred from the Weiser National Forest, Idaho, to the Northern Rocky Mountain Forest and Range Experiment Station, where he will assist in handling the range research work being conducted at the United States Range Livestock Experiment Station near Miles City, Mont., in cooperation with the Bureau of Animal Industry.

The California State Board of Forestry has appointed district foresters to take charge of the four districts into which the State has been divided for forest protection purposes. W. H. Coupe is in general charge of fire protection in the State, under the direction of State Forester M. B. Pratt, with headquarters at Sacramento, and also serves as district forester for the southern California district. Other district foresters are: C. G. Strickland, northern California district, Red Bluff; O. E. Fowler, central California district, Sacramento; and Frank E. Thompson, central coast district, Palo Alto.

E. V. Roberts, who was in charge of the program of reforestation in the Virgin Islands which was discontinued by the United States Forest Service July 1, has been assigned to the Forest Survey with headquarters at Washington.

Hugo L. Sundling has been transferred from the California Forest Experiment Station to an administrative position in region 3 of the Forest Service.

E. L. Hamilton, who has been in charge of the Standard Lumber Co. timber sale on the Sitgreaves National Forest, Ariz., has transferred to the California Forest Experiment Station.

William D. Miller, who spent the month of June at the Connecticut Agricultural Experiment Station, will be instructor in silviculture at the University of Idaho during the coming school year.

F. H. Sipe has been transferred from the Dry River ranger district on the Shenandoah (now George Washington) National Forest to the Damascus ranger district on the Unaka Forest, with headquarters at Damascus, Va.

William C. Bramble, who has done graduate work in forestry at Yale University and was awarded a national research fellowship, has accepted a position as instructor in plant physiology at Carleton College, Northfield, Minn.

W. S. Price, chief lumberman on the Plumas National Forest, Calif., has been appointed to the staff of the regional forester of the California region, to take charge of the timber-sale work formerly handled by J. C. Elliott.

Henry I. Baldwin, formerly with the Brown Co., Berlin, N. H., has been in charge of the junior division of Camp Riverton, Long Lake, N. Y., during the summer. He gave a course in forestry at the camp.

R. R. Chaffee has recently become eastern manager of the California Redwood Association with headquarters in New York City.

Honorary degrees were received this spring by the following members of the United States Forest Service: C. M. Granger, director of the Forest Survey, degree of doctor of forestry from Michigan State College; H. N. Wheeler, lecturer of the division of State cooperation, doctor of science from Milton College, Milton, Wis.; John D. Guthrie, assistant regional forester of region 6, master of science from Union College, Schenectady, N. Y.; R. D. Forbes, director of the Allegheny Forest Experiment Station, master of arts from Williams College.

B. F. Jones, of the Great Northern Paper Co., Raymond E. Rendall, of Bates College, and Austin Cary and C. R. Tillotson, of the United States Forest Service, have been asked by Forest Commissioner Violette, of Maine, to serve on an advisory committee for Indian Township, a State-owned area near Princeton in eastern Maine that is to be put under forest management.

Clyde Leavitt, for many years engaged in railway fire prevention work with the Board of Railway Commissioners of Canada, has accepted a special assignment to the research division of the New York State College of Forestry at Syracuse University, according to the Canadian Forestry Chronicle.

William G. McGinnies, professor of range ecology at the University of Arizona, formerly of the Forest Service, received the degree of doctor of philosophy in plant ecology from the University of Chicago this spring.

S. R. Black, secretary of the California Forest Protective Association, has been named by the Governor of California as a member of the State board of forestry, succeeding Edwin Mueller, resigned. Mr. Black took a prominent part in the organization of the forestry camps for unemployed men maintained by the State last winter.

## Bibliography

### Strength-Moisture Relations of Wood

By J. B. ALEXANDER, Forest Products Laboratories, Canadian Forest Service

The long-standing demand for more accurate and exhaustive information regarding the comparative strength of wood at varying degrees of moisture content has been met by a recent publication of the United States Forest Products Laboratory.<sup>3</sup>

In the introductory pages of this bulletin, a brief discussion is given on the occurrence of moisture in living trees; equilibrium moisture content; how moisture is associated with wood structure; and fiber-saturation point. Early investigations of the moisture-strength relation and the "straight-line" formulae derived therefrom are reviewed. The limitations of the straight-line formulae are indicated and from this point onward the discussion concerns the "exponential" formula only.

The tests, on the results of which this report has been prepared, have been divided into two groups: (1) Those reported in Forest Service Circular 108, The Strength of Wood as Influenced by Moisture, and in Forest Service Bulletin 70, Effect of Moisture upon the Strength and Stiffness of Wood; (2) those made specifically for this investigation.

The selection, seasoning, and size of test pieces of Group 1, together with the various mechanical tests, are described and the species investigated are named. Six charts follow, showing the logarithm of the strength function plotted against the corresponding moisture constant. Following the charts are tables showing data used in their construction.

As is to be expected, data used for Group 2 are much more complete and interesting than for Group 1. Trees were specially cut for this project—Sitka spruce and Douglas fir from Washington; yellow birch and white ash from Wisconsin. Logs were taken at varying heights from the stump. The careful matching, drying, and testing of the specimens are described, and 12 charts follow, showing the logarithm of several physical and mechanical properties plotted against the corresponding moisture content, together with the test data for each chart.

Moisture per cent at fiber-saturation point has been discarded and the moisture per cent at the intersection of the two arms of the strength-moisture curve has been emphasized. This moisture per cent, designated as  $M_p$ , was determined from experimental data by a least-square computation. Inasmuch as there are great variations in the strength values of seemingly identical test specimens, it seems questionable whether the laborious and refined calculations essential to the application of the method of least-squares to so large a number of tests is wholly warranted, as the  $M_p$  is given to the nearest per cent only. A percentage scale, showing the percentage deviation of any plotted point from the line drawn to average the series of points to which it belongs (which is shown on the charts), gives the reader a clear conception of the variation to be expected above or below the average for a given strength function. As  $M_p$  varies with species, the bulletin very pertinently points out that an accurate adjustment of test values requires accurate values for  $M_p$ , and that some method by which  $M_p$  can be found without exhaustive mechanical tests is very desirable. Various methods of determining and estimating  $M_p$  and charts

<sup>3</sup> Wilson, T. R. C.: Strength-Moisture Relations for Wood. U. S. Dept. Agr. Tech. Bul. 282, 88 pp., illus. 1932.

for its determination by shrinkage from green to oven-dry condition for the four species of Group 2 are shown.

A number of examples are worked out in detail to illustrate the use of the exponential formula for adjusting strength-moisture relations. Following these is a discussion of the effect of errors in estimating the values of  $K$  (the slope of the strength-moisture curve) and  $M_p$ . Obviously a knowledge of the effect of errors on these two factors is essential to the intelligent application of the formula in order to permit the computer to properly appraise the adjusted value.

It should be carefully noted that strength-moisture adjustments can be made, with any expectation of accuracy, only on small, clear specimens having uniform, or nearly uniform, moisture distribution. No such adjustment is possible for pieces of structural size with nonuniform moisture distribution and defects (natural or of manufacture), as the bulletin very clearly points out.

This bulletin has evidently been written for technical men, and to such it brings a wealth of information on a subject on which, up to this time, comparatively little has been known and still less printed and made available. The nontechnical public will find it hard to read.

## Properties and Uses of Western Larch

By S. V. FULLAWAY, JR., Western Pine Association

In publishing Technical Bulletin 285, entitled "Properties of Western Larch and Their Relation to Uses of the Wood," the Forest Service has added a worthy booklet to its series on important tree species; for larch, though its lumber has never been widely distributed, should be considered as important since it grows in abundance in the inland forests of the Pacific Northwest, particularly in western Montana and northern Idaho, and is a wood which possesses many valuable properties. This booklet as prepared by R. P. A. Johnson and M. I. Bradner deals with the subject in a comprehensive manner, starting with a discussion of the character of the larch forest, marketing practices, and mechanical and physical properties of the wood, and following with information about the grades of larch lumber and the many uses to which it is put. Tables, graphs, and illustrations amplify the descriptive matter.

It is unfortunate, of course, that the adoption of the term "ponderosa pine" by the Forest Service in place of the name "western yellow pine" occurred too near the date of issuance of the larch booklet to permit the correction of references to this wood in the several charts and in the descriptive matter.

The bulletin shows careful preparation and in general the fairness and accuracy of the statements can not be questioned. Probably the weakest part and the one most likely to draw fire from lumbermen who are primarily interested from the standpoint of manufacture and sale of the wood is the cataloguing of defects

and the attempt to put them on a percentage basis for each grade of larch. It indicates a negative rather than a positive approach which is unsound as a marketing principle. It attempts to average something which does not lend itself to averaging methods, and would have been better handled if piece descriptions had been given. Its accuracy as applied to the general run of larch lumber is questionable.

The discussion on the use of larch for shipping containers, plywood, and paper might well have been reduced to a few sentences. On the other hand, there is much to be said for the bulletin, and on the whole it will serve a useful purpose in behalf of larch, a wood of many uses.

## New Manual Describes Forest Insects

A Field Book of Destructive Forest Insects, by H. B. Peirson, State Entomologist of Maine, containing descriptions and illustrations of 22 of the more common forest insect enemies in the State, has recently been issued by the Maine Forest Service in cooperation with the Kennebec Valley Protective Association. R. E. Rendall, manager of the Bates Forest, Bates College, Me., says of the manual, "I have found it to be of value in the field. It is well arranged and very usable. \* \* \* Mr. Peirson has been very active in trying to perfect methods for combating destructive forest insects, particularly those attacking white pine, spruce, and white birch. This contribution is indicative of his thoroughness."

Measures for control of attacks on both forest and shade trees are outlined in the booklet and formulas for spray dilutions given.

Anyone interested can obtain a copy of the manual from the Maine Forest Service at Augusta, Me.

## Growth Study of Underplantings in New York State

By L. S. Gross, United States Forest Service

An interesting addition to planting literature is Bulletin No. 3 of the Black Rock Forest, A Study of Several Coniferous Underplantings in the Upper Hudson Highlands, by Henry H. Tryon. Twenty-seven planted areas were examined for the purpose of securing data for this publication. In addition to such native conifers as white pine, American larch, and balsam fir, the species in the plantations studied included exotics such as Norway spruce and Scotch pine, and American species not native to the region, such as Norway pine, silver fir, Sitka spruce, and Douglas fir.

The author shows very strikingly the utter futility of planting different species under a hardwood cover without benefit of subsequent release cuttings. His conclusions are brief and to the point. They are:



Since the factors of age of stock, soil quality, site, precipitation, and care in planting were about equal in all cases, it is evident that the height growth of coniferous underplantings of the species listed herein is in direct inverse ratio to the amount of overhead shade, coupled with the soil conditions and root competition involved thereby.

Even after 15 years of suppression under a heavy hardwood overstory, Norway spruce displayed a vigorous response to release cuttings, following which but little mortality occurred in this species.

Insect damage by the spruce gall louse is confined chiefly to spruce plantations which have been grown under heavy shade.

Coniferous underplantings of the species discussed in this study can not, in the Hudson Highlands, be successfully brought to maturity without subsequent cultural treatment which will in due time admit sufficient sunlight to the plantation.

The bulletin is well illustrated with reproductions of excellent photographs showing the development of planted conifers under hardwood shade as compared with the development of the same species in locations not subject to the influence of the hardwood overstory.

## A Study of European Larch in the United States

By E. E. CARTER, United States Forest Service

Only a few species of trees have given satisfaction when planted for timber production far outside their natural ranges. One that has been so used with fair success is European larch. A recent bulletin by S. S. Hunt<sup>4</sup> summarizes the available information about the plantations of this tree in the northeastern United States.

European larch does not reproduce well outside of its rather limited natural range, but it has been widely and successfully planted in Europe, notably in Scotland and Scandinavia. Plantings in the United States have been fairly successful as far west as Iowa. Source of seed is important, and Mr. Hunt warns against seed from the Tyrol, recommending the use of either Silesian seed or that from the strain which has been grown so successfully in Scotland and from which the older Swedish plantations were started. Later use in Sweden of Tyrolean seed gave distinctly inferior results. Most plantations in the United States seem to have come from the thinner-barked, straighter, more frost-resistant Scotch strain.

The bad effects of close spacing and the necessity for thinning early and repeatedly are emphasized in the bulletin. This tree must have light; the uselessness of planting so intolerant a species under even the slightest shade is brought out. Planting in pure stands is not recommended because of the danger of

pests, but the author is encouraging concerning the larch sawfly and the European larch canker. The liability of damage by porcupines is mentioned. The rapid early growth of the species is discussed and illustrated, and a yield table, in cubic feet, bark included, for northeastern plantations up to 60 years of age is given, indicating mean annual growths of 67 to 93 cubic feet per acre per annum.

Fall planting is recommended because of the early starting of growth in the spring; "if a frost occurs soon after planting [in the spring], the trees are in poor condition to recover." In fact, frost damage is mentioned repeatedly, with the statement that in the tree's natural range late frosts are unusual. The recommendation for 1-2 stock will come as a surprise to some who have worked with the species. The tendency for very uneven development in first-year seed beds is not mentioned.

The durability of the heartwood and its resistance to penetration by preservatives, contrary to the ready penetration of the sapwood, are the chief points discussed in connection with properties and uses. In Europe the wood is in demand for ties, posts, and poles. Mr. Hunt reports it to be the favored wood for power-line poles in Sweden.

## Recent Books and Pamphlets

- Bates, E.: Commercial survey of the Pacific Northwest. 356 pp. illus., maps, diags. (U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Domestic Commerce Series no. 51.) Washington, D. C., 1932.
- Blanckmeister, J.: Über die entwicklung der humusaufilage in nadelholzbeständen im laufe des bestandeslebens. 77 pp. illus., maps. Königsbrück i. Sa., A. Pabst, 1931.
- Boyce, J. S.: Decay and other losses in Douglas fir in western Oregon and Washington. 60 pp. illus., pl., maps, diags. (U. S. Department of Agriculture technical bulletin 286.) Washington, D. C., 1932.
- Chapman, H. H., and Demeritt, D. B.: Elements of forest mensuration. 452 pp. illus., diags. Albany, N. Y., 1932.
- Clayton, C. F., and Nichols, W. D.: Land utilization in Laurel county, Ky. 100 pp. maps. (U. S. Department of Agriculture technical bulletin 289.) Washington, D. C., 1932.
- Compton, W. M.: The lumber industry at the crossroads. 27 pp. diags. National Lumber Manufacturers Association, Washington, D. C., 1931.
- Cosgrove, J. R.: Empire timbers from home and overseas for building and structural purposes. 24 pp. (Great Britain, Department of Scientific and Industrial Research, Forest Products Research Board leaflet 5.) London, 1931.
- Fritz, E.: The rôle of fire in the redwood region. 23 pp. illus. (California Agricultural Experiment Station circular 323.) Berkeley, Calif., 1932.

<sup>4</sup> European Larch in the Northeastern United States: A Study on Existing Plantations. Harvard Forest Bulletin 16. 1932.

- Guinier, P.: La station de recherches et d'expériences forestières de l'école nationale des eaux et forêts: douze années d'activité (1920-1931). 10 pp. Paris, 1932.
- Hunt, S. S.: European larch in the northeastern United States: a study on existing plantations. 45 pp. illus. (Harvard Forest bulletin 16.) Peterham, Mass., 1932.
- International Institute of Agriculture: Forestry statistics for 31 countries. 50 pp. Rome, 1932.
- Jones, D. L., and others: Trees and shrubs in northwest Texas. 63 pp. illus. (Texas Agricultural Experiment Station bulletin 447.) College Station, Tex., 1932.
- Kentucky State Forest Service: Kentucky's forest conditions through the camera. 54 pp. illus. (Kentucky Forest Service bulletin 9.) Frankfort, Ky., 1932.
- McAloney, H. J.: The white-pine weevil. 31 pp. illus. (U. S. Department of Agriculture circular 221.) Washington, D. C., 1932.
- United States Department of Commerce, Bureau of Foreign and Domestic Commerce: The forest resources and lumber industry of Soviet Russia. 11 pp. (Trade information bulletin 798.) Washington, D. C., 1932.
- Winters, R. K.: Stem form of white oak. 62 pp. pl., diags. Lansing, Mich., 1932.
- Soil Science, May, 1932.—A quantitative study of the microörganic population of a hemlock and a deciduous forest soil, by Mary J. Cobb, pp. 325-345.
- South African Journal of Science, November, 1931.—Some remarks on soil erosion and reclamation, by W. S. H. Cleghorne, pp. 98-102.
- Southern Lumberman, May 15, 1932.—Recent chemical treatments for the control of sap stain and mold in southern pine and hardwood lumber, by R. M. Lindgren and others, pp. 43-46.
- Tharandter Forstliches Jahrbuch, 1932, vol. 83, no. 3.—Der nebelniederschlag im wald und seine messung, by K. Rubner, pp. 121-149.
- United States Department of Agriculture, Journal of Agricultural Research, February 1, 1932.—Light intensity in relation to plant growth in a virgin Norway pine forest, by H. L. Shirley, pp. 227-244. February 15, 1932.—The relation of mycorrhizæ to conifer seedlings, by R. E. McArdle, pp. 287-316. March 15, 1932.—A simple method of constructing tree volume tables, by D. B. Demeritt and A. C. McIntyre, pp. 529-539.

### Recent Publications of the Forest Service<sup>5</sup>

- Technical Bulletin 282-T, Strength-Moisture Relations for Wood, by T. R. C. Wilson.
- Technical Bulletin 283-T, Timber Growing and Logging Practice in the Coast Redwood Region of California, by S. B. Show.
- Technical Bulletin 285-T, Properties of Western Larch and Their Relation to Uses of the Wood, by R. P. A. Johnson and M. I. Bradner.
- Technical Bulletin 298-T, Experiments in Naval Stores Practice, by Lenthall Wyman.
- Technical Bulletin 304-T, An Alinement Chart Method for Preparing Forest-Tree Volume Tables, by L. H. Reineke and Donald Bruce.
- Farmers' Bulletin 1210-F, Measuring and Marketing Farm Timber, by W. R. Mattoon (reprint).
- Farmers' Bulletin 1405-F, The Windbreak as a Farm Asset, by C. G. Bates (reprint).
- Farmers' Bulletin 1492-F, Arbor Day, by L. C. Everard (reprint).
- Contemporary Review, March, 1932.—Influence of forests on rainfall, erosion, and inundation, by E. P. Stebbing, pp. 359-366.
- Ecology, April, 1932.—Vegetation on north and south slopes of mountains in southwestern Texas, by H. J. Cottle, pp. 121-134; The influence of continued heavy grazing and of promiscuous burning on spring-fall ranges in Utah, by G. D. Pickford, pp. 159-171.
- Plant Physiology, April, 1932.—Seasonal shrinkage of Monterey pine and redwood trees, by F. W. Haasis, pp. 285-295.
- Scientific Monthly, April, 1932.—Erosion on uncultivated lands in the intermountain region, by C. L. Forsling, pp. 311-321.

<sup>5</sup> Prices of these bulletins will be furnished by the Superintendent of Documents, Washington, D. C., on request.