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FOREST WORKER



March, 1931

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

Annual Meeting of National Conference on State Parks

The eleventh annual meeting of the National Conference on State parks will be held May 27-28 in St. Louis. Arrangements have been made for a 1-day trip to one of Missouri's principal State parks following the meeting and for an alternative 3-day field trip into the Ozark region.

American Forestry Association Meets at Asheville

The American Forestry Association and the North Carolina Forestry Association will meet June 3, 4, and 5 at Asheville, N. C. Headquarters will be at the Grove Park Inn. Programs of talks and discussions

will be supplemented with a tour of the Biltmore Forest, a trip to the top of Mount Pisgah, and a visit to a local rayon plant.

Florida Commercial Forestry Conference

A Florida commercial forestry conference will be held at Marianna, Fla., April 17-18. The Florida Chamber of Commerce, the Florida Forestry Association, and the Florida Forest Service are cooperating in arrangements for the conference, with assistance from the United States Chamber of Commerce. The program will cover the same general field as commercial forestry conferences recently held in several other States. Particular stress will be laid on the possibilities Florida offers for pulp and paper manufacture and on matters relating to forest taxation.

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State Forestry

Arkansas Enacts Forestry Measure

An act of the Arkansas Legislature approved in March provides for the establishment of a State forestry commission consisting of the dean of the College of Agriculture of the University of Arkansas, the State commissioner of mines, manufactures, and agriculture, and three members appointed by the governor. The act provides for the appointment of a technically trained State forester and for cooperation with the Federal Government and the Arkansas College of Agriculture in preventing and suppressing forest fires and in gathering and disseminating information concerning the growth, utilization, and renewal of forests.

The legislature adjourned without appropriating any funds for the use of the forestry commission.

Tractor Works Fast on Los Angeles County Fire Line

A tractor owned by Los Angeles County, Calif., proved extremely useful in a fire-suppression job described by L. S. Percey, of the county forestry department. The fire occurred last November, starting in Ventura County and burning into Los Angeles County.

Owing to the rapid advance of the fire, it was decided to cut a fire line and back fire. Forty men were hastily recruited and were put to work cutting a fire line 20 feet wide. After four hours' work the fire line was only one-half mile long. At this juncture a county forestry department tractor equipped with back fillers and lights arrived at the fire. The tractor first opened an old mountain road to admit waiting tank trucks to the scene of action. It was now dark, but the tractor was put to work on the fire line, relieving the men to begin back-firing. In four hours' time the tractor had cut 3 miles of fire line 20 to 40 feet wide—a job that would have required the efforts of 200 men.

While this was going on, wherever possible the tank trucks were following up the back-fire crews and "dousing" the last glowing embers along the fire line.

Later in the night the tractor was used to fell and bury burning snags. The following morning it was used to "cold trail" 1 mile of hot line, which it finished in about 30 minutes. Several days later, on another

fire that burned from Ventura County into Los Angeles County, the tractor was used to "hit" the burning line, and successfully cold-trailed it. In this enterprise the tractor was backed up with a tank truck.

The Los Angeles County Forestry Department is now preparing to equip a tractor with a high-pressure pump and tanks to carry 500 gallons of water. This equipment will be used on locations where tank trucks can not be taken. The tractor will be used ordinarily on improvement work, but can be converted into fire apparatus in less than one hour.

South Carolina Commercial Forestry Conference

Unified effort toward the development of commercial forestry in South Carolina was the purpose of a meeting at Columbia, on January 21 and 22, that brought together representatives of the State's commercial, industrial, agricultural, educational, and recreational interests. Plans for the meeting had been worked out by a general committee headed by L. I. Guion, of Lugoff, S. C., with assistance from the United States Chamber of Commerce. In a preparatory statement issued in December the Chamber of Commerce said:

This is the first conference of its kind to be held in South Carolina and augurs well to bring about new support in the conservation of her forest resources, which annually bring in over \$24,000,000 for lumber products and in excess of \$10,000,000 for salaries and wages. It is surprising to note that whereas 67 per cent of all the forests of the United States needing protection are safeguarded from fire by some form of organization, South Carolina is just launching forth in this activity and has only 2 per cent of its forests protected.

Thirty speakers discussed the various relationships through which forestry contributes or can contribute to the welfare of the State and ways in which this contribution can be amplified and perpetuated.

Resolutions adopted by the conference request increased State appropriations for forest-protection activities, Federal studies of erosion control in the Appalachian region, Federal support for forest research in the Coastal Plain region, a Federal study of wood waste in the State, and institution of a course in game

production in the Clemson Agricultural College. Action was taken toward forming a State forestry association, the working out of a plan of organization being entrusted to Mr. Guion and a committee of five to be named by him.

South the Greatest Loser from Forest Fires

Of the 589,800,000 acres of land in the United States needing systematic protection from fire, 38 per cent lies in the Southern States; of the 190,900,000 acres of land that needs fire protection but is not protected, the South contains 86 per cent. The Southern States as here referred to are Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Mississippi, Texas, Arkansas, and Oklahoma. The figures quoted are based on reports by State foresters to the United States Forest Service for the calendar year 1929 and national forest statistics for that year. They do not cover national parks or Indian lands, and are limited to continental United States exclusive of Alaska.

In 1926 fire protection was provided for 64 per cent of the area in the United States classed as needing such protection; by 1929 the proportion had increased to 68 per cent. In the South the corresponding increase was from 24 per cent to 27 per cent.

Not only is fire protection less widespread in the South but southern forest areas are more subject to burning than those elsewhere in the United States. Reports for 1929 indicate that in the United States as a whole 1.2 per cent of the land under protection in that year was burned; for the South the corresponding percentage was 2.8. The percentage of land with and without protection reported as burned over during 1929 was 7.8 for the United States, 19.1 for the South. Of all the land in the United States, protected and unprotected, reported as being burned over during the year, 92.6 per cent was southern land.

Forest fires reported as occurring on protected areas in 1929 numbered 44,100 for the United States as a whole, 16,000 for the South. The total number of forest fires reported for the year was 134,900 for the United States, 105,200 for the South. Damage estimates reported to the Forest Service would indicate that in 1929 the forest fire losses borne by the South made up 88 per cent of the country's total.



Appropriation acts approved by Governor Roosevelt in January provided \$18,000 to be used by the New York Conservation Department in gypsy-moth control and forest-nursery work. It was arranged to employ 15 men immediately as an addition to the forces endeavoring to prevent the gypsy moth from becoming established in New York. Between 15 and 20 additional men were to be put to work in the forest nurseries making racks for seed beds.

State Forestry Appropriations for 1930

Money appropriated for forestry purposes by 45 States, Porto Rico, and Hawaii for the year ending June 30, 1930, amounted to \$7,297,935. This total includes some money received through the sale of forest products and nursery stock; it does not include the balance of about \$2,000,000 remaining at the opening of the year from New York's 1924 bond issue for purchase of forest land, nor does it include \$155,000 that was allotted for fire suppression within the year by the Minnesota State Board of Relief.

Amounts set aside by 38 States for forest fire protection totaled \$2,555,329. This represents an increase of nearly 50 per cent over the State fire-protection appropriations for the year ending June 30, 1928. Appropriations for 1930 covering other phases of State forestry work likewise showed substantial increases over those for 1928. For the purchase and maintenance of State forests \$2,308,801 was appropriated for 1930, as compared with \$1,489,086 for 1928, an increase of 55 per cent. Funds set up for protecting forests from insects and disease in 1930 amounted to \$362,596, an increase of 25 per cent. The most striking development is that indicated by the 1930 State appropriations for nurseries and reforestation work, which amounted to \$1,106,711 and represented an increase of more than 100 per cent.

States appropriating funds to be used in 1930 in protecting forests from disease or insects or both numbered 12, whereas only 4 had made funds available for that purpose in 1928. Nursery and reforestation appropriations for 1930 were made by 38 States, Porto Rico, and Hawaii, the number of States providing funds for such work being increased by 4 over the 1928 total.

The largest forestry appropriations made by individual States for 1930 were those of New York and Pennsylvania. Aside from the New York bond issue funds referred to in the foregoing these were nearly identical, \$1,531,582 for New York and \$1,528,860 for Pennsylvania. Ten States appropriated more than \$200,000 each.

Man-Caused Fires Cost North Carolina \$11 Each

Forest fires covered 3.04 per cent of the area under protection in North Carolina in 1930. This drought-year record is not so good as those of the favorable years 1928 and 1929 and is a shade in excess of the corresponding figure for 1927. It is better, however, than the records of the four years 1923-1926.

Last year 45 North Carolina counties cooperated with the State in forest fire protection work and the protective system covered 10,025,370 acres, the largest area protected in any year since this work was inaugurated by the State. The number of fires was 3,596,

the largest recorded in the 8-year period for which the State forest service has records. Fires attributed to lightning numbered 32. Fire-control expenditures in the cooperating counties amounted to \$39,709. Assistant Forester Charles H. Flory points out that each careless act resulting in a forest fire in the State during 1930 cost the public an average of \$11.

Provisions of Clarke-McNary Law Extended to Porto Rico and Hawaii

A congressional resolution approved March 3 extends to Porto Rico the provisions of sections 1, 2, 6, and 7 of the Clarke-McNary law. This will permit the acquisition of lands in Porto Rico, by purchase or gift, for national forest purposes, and will enable the insular government to obtain Federal cooperation in forest fire protection. Previous legislation had authorized Federal cooperation with the island in the production and distribution of forest planting stock and in forestry extension work.

A similar resolution recently approved extends the fire-protection provisions of the Clarke-McNary law to Hawaii.

Growth of Shortleaf and Norway Pine in Western Pennsylvania Plantation

Shortleaf pine planted on the watershed of the New Western Penitentiary, Rockview, Centre County, Pa., although slightly out of its natural range, has grown so well that Harry G. Eby, forester of the Pennsylvania Department of Welfare, considers it one of the best two conifers for planting in that locality. Planted as 2-year seedling stock, after five years in the field it averages 36.1 inches in height.

The planting site is in old fields lying between the two ridges of Nittany Mountain, at an elevation of approximately 1,600 feet. The soil, varying from sand to shale, is described by Mr. Eby as deep, porous, and ideal for tree planting. The volunteer growth in the fields is practically all coniferous—pitch, northern white, Virginia, and mountain pine. Shortleaf, Scotch, and northern white pines and Engelmann spruce, all grown in the penitentiary nursery, were planted in 1926 on 25 acres of the watershed. Two years later the plantation showed an average survival percentage of 93. Measurements taken by Mr. Eby in the winter of 1930-31 were as follows:

Species	Number of trees measured	Average height (inches)	Maximum height (inches)	Most common height (inches)
Shortleaf pine ¹	147	36.1	56	36
Scotch pine ¹	204	33.6	54	30
Northern white pine ²	74	22.4	41	18

¹ Planted as 2-year seedlings 3 to 4 inches high.

² Planted as 3-year seedlings 4 to 5 inches high.

The shortleaf pine had an advantage over the other pines planted with it in that it suffered no damage from natural enemies. The Scotch pine was somewhat damaged by deer eating the terminal clusters of buds, and the northern white pine, planted in pure stand, was severely injured by weevil. The Engelmann spruce survived but suffered frost damage every spring.

In 1927 an additional 25-acre plantation was made on the watershed with 3-year seedlings of Scotch and Norway pine. The Scotch pine seedlings, which were from 12 to 18 inches tall when planted, have done almost as well as 2-year stock, Mr. Eby reports, although their mortality was slightly higher and their growth was short for the first two years. The Norway pine "has done best of all and is truly a picture." Its percentage of establishment is about 98 and its growth is uniform. The 103 trees measured averaged 18.7 inches in height. The tallest tree was 31 inches high, and 25 per cent of those measured were 18 inches high or higher.

Alabama Plants 33 Miles of Shade Trees

Thirty-three miles of shade trees were planted along Alabama highways during the past fall and winter, State Forester Bunker reports. The federated women's clubs of the State initiated the planting projects and had the cooperation of the highway department and the commission of forestry, the latter providing most of the trees and supervising the planting operations. The plantings were mostly of live oak and water oak. Other trees used were sycamore and hackberry. Roadside trees previously planted in Alabama suffered severely from the 1930 drought, and 863 trees were planted during the fall and winter as replacements.

The office of H. M. Sebring, assistant State forester of Georgia, has been removed from Albany to Macon. A new district forester is to be located at Albany, with southwestern Georgia as his territory. The territory covered by Assistant State Forester Everett B. Stone, jr., with headquarters at Gainesville, has been enlarged to include all the northern part of the State. Mr. Stone will have under his supervision District Forester W. D. Young, at Rome, and a new district forester to be located at Columbus.

Unemployment relief has been provided in New Jersey during the winter months through a salvage operation in burned cedar on the Bass River State Forest and through improvement work on the Voorhees State Park. Each man sent by the High Bridge unemployment committee who did a day's work on the park received in exchange a load of firewood.

Maine to Develop Forestry Demonstration

Maine's commissioner of forestry, Neil Violette, has decided to institute forestry management on a State-owned township near Princeton known as Indian Township. The land is fairly well timbered with both softwoods and hardwoods. The man employed to manage it will be expected to sell enough timber to pay his own salary and expenses, a plan amply justified by the quantity of timber present. It is Commissioner Violette's hope that the management of this township will bring out the best methods of managing forest lands of similar character in northern Maine. He expects to receive helpful suggestions from some of the timberland owners in that section.

The State of Maine has no regularly established State forests. This tract is expected to serve equally well for the purpose of a practical forestry demonstration on a large scale.

The forest school of the University of Maine will have its winter camp on Indian Township, and the students will help to develop the area.

Forest Area Bordering Highway Given to Connecticut

The State of Connecticut has come into possession of a 186-acre tract of land in the town of Tolland, near West Willington Station, which State Forester Hawes describes as having excellent facilities for forestry demonstration purposes. The land is located on the State highway from Rockville to Willington. This makes it particularly desirable in view of the fact that while Connecticut owns more than 55,000 acres of State forests it has only about 9 miles of State highway bordered by State forests on one side and only about 3 miles so bordered on both sides. The tract is a portion of the land allotted to Ebenezer Nye in 1721 and 1722. It has come into State ownership as a gift from Mrs. William H. Hall, of South Willington. In accordance with Mrs. Hall's wish the property will bear the name "Nye-Holman Demonstration Forest," in memory of her maternal grandparents and her father. The house on the property will be used as headquarters for the Soapstone and Nipmuck State Forests.

During the biennium ending June 30, 1930, the acreage of Connecticut's State forests was increased by more than 25 per cent. On that date it stood at 53,744.



New Jersey State forest sales and leases brought in \$3,390 in the six months ending December 31, 1930. Income from the Lebanon Forest alone amounted to \$1,958.

Michigan Enlarges State Forests

From a single unit established 27 years ago, Michigan's system of State forests has grown until to-day it comprises 12 units. In gross area these State forests range from 23,000 acres to 255,340 acres. The most rapid expansion of the State forest system has taken place within the past two years, with the addition of 302,571 acres to the areas previously placed under administration. No new units were added during the biennium, the additions consisting of privately owned lands within State forest boundaries. Of the total area added the State acquired 38,536 acres by purchase, 15,398 acres through exchange, 637 acres by gift, and 248,000 acres by way of tax delinquency.

The 255,340-acre unit is the Ogemaw Forest, located in Ogemaw, Roscommon, Gladwin, and Arenac Counties. Of this area the State owns 49 per cent, or 125,193 acres. At the beginning of the year 1931 plantations on the Ogemaw Forest totaled 11,146 acres. The smallest of the forest units is the Alpena State Forest, in Alpena County, having a gross area of 23,762 acres of which the State owns 14,749 acres.

Michigan's State forests are protected by 1,423 miles of firebreaks, 247 miles having been constructed within the past two years. All these firebreaks are constructed on the same plan: A strip 16 feet wide is brushed out, within this a 14-foot strip is grubbed, and within this a 10 or 11 foot strip is plowed. Although the first cost is high, maintenance costs amount only to about \$3 or \$4 per mile per year. To the effectiveness of this system of firebreaks the State department of conservation largely attributes the fact that in 1930, although weather conditions were exceptionally unfavorable, fires covered less than four-tenths of 1 per cent of Michigan's State forest area.

Ohio's Forest and Park Holdings Almost Doubled in Two Years

Ohio nearly doubled its State forest and State park holdings in the biennium 1929-30. The most recent addition is the Zaleski Forest of 3,400 acres in eastern Vinton County. This is the first area purchased in Vinton County, although it is only 4 miles west of Waterloo Forest, in Athens County.

The Shawnee Forest, which two years ago had an area of 17,000 acres, now has one of 35,800 acres. Pike Forest has been enlarged from 3,550 to 7,588 acres. The Hocking series of forest parks has been increased from 2,000 to 2,832 acres, the Virginia Kendall Park of 400 acres has been acquired, the Mohican Park of 350 acres purchased and later increased to 850 acres, and the Hocking Experimental Forest of 608 acres purchased, all since the beginning of 1929.

On February 1, 1931, the State forestry department's holdings, including the Wooster Arboretum and the Marietta Forest Nursery, totaled 59,206 acres.

Forestry Program Proposed for Norfolk County, Mass.

Another 10-year county forestry program has been worked out in Massachusetts by a committee representing various local interests and the Massachusetts Forestry Association. This time the recommendations apply to Norfolk County, which fronts on Boston Bay and extends southwest to the Rhode Island State line.

According to an estimate by the Massachusetts Division of Forestry 153,000 acres, or 52 per cent, of Norfolk County's land area is under some sort of forest growth. Most of this growth is of inferior quality, consisting largely of maple and birch suitable only for fuel. There is little timber of such size as to be merchantable for lumber; on the other hand, much of the older growth has exceptionally high aesthetic value, particularly in the northern towns, which are already within the metropolitan district or are rapidly coming under its influence. Very few woodland owners in the county, the committee found, are making any serious effort to bring their forest land into a condition of maximum productivity. At present there is little incentive for the woodland owner to invest money in improving his forests, because of the lack of markets for the products.

The committee found Norfolk County well supplied with lookout towers and most of the larger towns well equipped for forest fire fighting. Fire control in the county has not, however, been adequate. It has shown great improvement in the past few years, since organization of the Forest Wardens Association has resulted in better cooperation between town fire wardens.

The committee strongly recommends that Norfolk County accept the provisions of the Massachusetts law through which the State offers to pay half the cost of forest fire patrol maintained by any county. This law was enacted on the basis of favorable results obtained in the 3-year fire-protection experiment carried out on Cape Cod. In excessively dry periods during the fire season it recommends supplementing county patrol with town patrol. As an example of the value of town patrol it cites the fact that for three years following adoption of the patrol system by the town of Plymouth fire losses in the town averaged less than 10 per cent of the previous annual average, and that the cost of forest protection was at the same time reduced more than three-fifths. In Plymouth a patrolman is placed on duty in each of six districts on Saturday afternoons, Sundays, and holidays during the fire season. The elimination of hazards such as town dumps or logging slash is recommended as one of the best forms of preparedness in fire prevention. A reminder that many fires get beyond control because the local warden does not know the location of the water supply nearest

to the fire and hence loses time in determining where to locate his pump introduces the suggestion that each warden and deputy warden should have a map of his territory on which are indicated all water supplies suitable for operating a portable pump, and should familiarize himself with the locations of these supplies. The installation of summer water service, with the pipes merely laid on the ground, is mentioned as a well justified measure for protecting forest tracts lying beyond permanent town water service and lacking natural water supplies.

Referring to the brushing out of woods roads so as to divide large forested areas into tracts of about 160 acres each, as in the Cape Cod experiment, the committee says "There is no more useful type of work to be found for the unemployed." Other fire-protection measures recommended include educational work through the public schools, purchase of at least one more State forest fire truck for use in Norfolk County, and the use of town-owned power sprayers for forest-fire work.

Owners of northern white pine timber are urged to avail themselves of the blister rust control service provided by the Massachusetts Department of Agriculture.

Because of the limited area of the individual forest tracts in Norfolk County there is little opportunity to establish State forests there. This, the committee holds, makes it all the more important that town forests be developed. Norfolk County contains only 5 of the 90 town and city forests in Massachusetts. In the Walpole town forest the county has an excellent example of a well-developed town forest that is used for park purposes. The establishment of town forests in Massachusetts is encouraged by the State Forestry Association's standing offer to plant 5,000 trees free of charge for any town that will establish a forest of 100 acres or more.

Formation of woodland owners' associations throughout the county is recommended as a possible means of extending the practice of forest management and increasing profits from production of forest crops.

The members of the committee were Augustus Hemenway, jr., Canton (chairman); Phillip R. Allen, Walpole; William Edwin Clark, Sharon; Samuel C. French, Westwood; Willis H. Hoyt, Walpole; H. Franklin Perry, Weymouth; and Harris A. Reynolds, Belmont.



The Governor of Utah has agreed to cooperate with the United States Forest Service in installing a forestry exhibit on the ground floor of the State Capitol. A relief map of Utah will form the central feature of the exhibit and will be surrounded by models representing forest management, watershed protection, range management, and forest recreation.

New York Spends \$350,000 on Game and Fish

New York's conservation fund, into which is turned half of all the money received by the State from the sale of licenses for hunting, trapping, and fishing, was drawn upon last year to the extent of \$350,000 for the benefit of hunters and fishermen. For planting fish and establishing and maintaining rearing stations \$144,442 was expended; for biological survey, including fish protection, \$58,825; for acquisition of non-agricultural land outside the forest preserve for game refuges and demonstration forests, \$49,296; for game surveys, purchase of game birds and quadrupeds, game bird farm labor, etc., \$37,355; for the Ithaca game farm, \$16,853.



Recent purchases have added 38,562 acres to the area of Vermont's State forests. The prices paid averaged less than \$3 per acre. The Proctor-Piper Forest in Cavendish has been enlarged by 60 acres and the Calvin Coolidge Forest by 1,428 acres.



Forest tree seedlings distributed from the State nursery of South Carolina in January and February of this year totaled about 900,000.



Plantations on and around Chubb Hill, N. Y., on the main highway between Saranac Lake and Lake Placid, which were established in the period 1904-1909 by the late Clifford R. Pettis, superintendent of State forests from 1910 to 1927, have been designated as the Clifford R. Pettis Memorial Forest. The plantations are part of the State forest preserve. They lie along both sides of the main highway and cover several hundred acres.



Deer killed by licensed hunters in New York State in the recent hunting season numbered 7,085. This is the largest number taken in any one year since the enactment of the law providing for a special license for deer hunters.



The Cumberland Falls tract has become the property of the State of Kentucky, an amicable agreement having been reached by representatives of the State and of the power interests which held an option on the tract. For 589 acres of land including the falls the State paid \$400,000. Of this amount \$230,000 had been given to the State by the late Senator T. Coleman du Pont and the remainder was given by the Senator's widow and other heirs.

Michigan Plants 329,145,000 Fish During 1930

In 1930 the Michigan State fish hatcheries planted 329,145,000 fish of various kinds in the inland waters of the State and in Lakes Superior, Huron, and Michigan and Saginaw Bay. This is reported by the State department of conservation as the largest annual plant in the history of fish propagation in Michigan. It included 5,480,000 brook, brown, and rainbow trout fingerlings 3 months old, nearly 9,000,000 6-months-old perch, 2,800,000 4-months-old bluegills, and 800,000 large-mouth and small-mouth black bass. During the year 10 raceways were added to the Baldwin trout-feeding station and 5 bass and bluegill rearing ponds were constructed at the Wolf Lake hatchery, and the Tahquamenon River and Silver Creek trout-feeding stations were doubled in capacity. The State acquired 40 acres trebling the length of the nursery section of the White River trout-feeding station and property in the neighborhood of the Wolf Lake hatchery that will be operated in conjunction with it, and received as a gift from the Hillsdale Chapter of the Izaak Walton League the Emery Mills site, near Hillsdale, where two bass and bluegill rearing ponds are under construction. Also during 1930, the Institute for Fisheries Research was organized in cooperation with the University of Michigan. This institute, which is under the direction of Carl L. Hubbs, has taken over the investigations formerly conducted by the late Jan Metzlaar. The State division of the Izaak Walton League has cooperated with the institute by establishing three scholarships for fisheries research in the University of Michigan.



Establishment of four new town forests in Massachusetts during 1930 increased the aggregate area of such forests in the State by one-third, making it 25,535 acres. For that year town forest appropriations totaled \$20,358 and the number of trees planted on town forests was 494,000.



The first forest fire observation tower in southwestern Georgia was recently erected by the Pine Island Timber Protective Organization near Albany, Ga. The tower is 60 feet high and is located on a 20-foot hill. It has an inside stairway built of heart cypress.



Under a law of 1929 commercial termite-control operations in California are regulated by the State, all persons engaging in the business of repairing structures damaged by termites being required to hold certificates issued by the county agricultural commissioner.

Education and Extension

Nebraska Snow Fence Plantings Reach Useful Stage in Three Seasons

Trees planted in Nebraska in 1928 on land adjoining the right of way of the Chicago, Burlington & Quincy Railroad have already, in some places, grown large enough to serve effectively as railroad snow fences, writes Extension Forester Clayton W. Watkins. Under a plan suggested by the extension service which was designed to supply snow fences for the protection of railroad lines and shelter belts for adjacent farm land, as well as serving a beautifying purpose, the railroad purchased trees, planted them on land belonging to cooperating farmers, and took responsibility for caring for them. Requirements as to care were well fulfilled and the plantings are rated about 85 per cent successful, as compared with an average of about 60 per cent for regular farm shelter-belt demonstrations in Nebraska. One hundred and eleven of these demonstration snow-fence shelter-belt plantings are developing, at points scattered pretty well over the State. The most successful one of all is on table-land in western Nebraska where trees are rather rare. Its three rows of trees include Chinese elm, Russian-olive, and caragana. It has been grown without water but has been cultivated and hoed regularly.

Practical Work of First-Year Students in Pennsylvania State Forest School

By J. A. FERGUSON, Pennsylvania State College

The 75 students of the Pennsylvania State Forest School who are now at Mont Alto engaged in the first year's work of the forestry and forest ranger courses devote one day each week to practical work on the Mont Alto State Forest and State Forest Nursery. During the year they take part in all the activities of the forest. In this way they gain facility in the use of woods tools, learn woods methods at first hand, and acquire a conception of the practical problems of administration with which a forester in charge of more than 20,000 acres of forest land and a forest nursery is confronted in the course of a year. During the past school year student labor on the forest and nursery totaled 13,089 man-hours. Of this total, improvement cutting claimed 4,104 hours; road work, 2,769 hours; nursery work, 2,702 hours; cleanings, 1,045 hours; preparation of planting sites, 914 hours; pruning operations, 855 hours; and planting in the field, 700 hours.

In addition, the forestry students at Mont Alto form a part of the fire-fighting force for the region. They are organized and trained in three crews, under

student leaders. Each student is equipped to perform his particular crew duty. As fire fighters the students work under the direction of State forest officers and under the immediate supervision of their instructors. Last year they were called out to suppress 14 forest fires and devoted 1,619 man-hours to fire fighting.

University of Montana Prepared to Distribute 1,000,000 Forest Trees in 1931

The forest nursery established by the University of Montana in 1927, under provisions of the Clarke-McNary Act, is now ready to supply farmers of the State with 1,000,000 trees a year. The trees are available at a low charge for planting farm shelter belts, windbreaks, and woodlands. In 1930 the nursery shipped about 500,000 trees.

In regard to choice of forest tree species for planting and in regard to methods of planting and caring for the trees, farmers in the prairie sections of Montana have the benefit of many years' experimentation directed by the Northern Great Plains Field Station of the United States Department of Agriculture, at Mandan, N. Dak. Hardwood species available for distribution from the university nursery include caragana, Russian-olive, boxelder, golden willow, cottonwood, "North-west poplar" (*populus* sp.), Chinese elm, American elm, green ash, laurel willow, European larch, and "Ross northwestern poplar," a hybrid obtained in the vicinity of Saskatoon, Canada. The conifers include blue spruce, western white spruce, jack pine, Scotch pine, and western yellow pine.

New York State Forest Research Institute

The New York State Forest Research Institute has been established as a division of the New York State College of Forestry, in order to give the college's research work more effective direction and further the application of its results to the practice of forestry in the State. A particular purpose is to give greater assistance in public and private reforestation work. Clifford H. Foster, director of the Pack Demonstration Forest, is to be acting director of the institute.

The college is conducting forest research on the ranger school forest of 2,300 acres at Wanakena, near Cranberry Lake, in the western Adirondacks; at the Pack Demonstration Forest of 2,400 acres near Warrensburg, N. Y.; at the State forest experiment station, in Syracuse; and on lands owned by the college near Salamanca, in Cattaraugus County.

Montana University "Tractor School"

Men using tractor equipment and power machinery in the woods are invited each year by the University of Montana to attend a "tractor school" of several days' duration in which the use and maintenance of such machinery are demonstrated and explained and new models are shown. Approximately \$30,000 worth of machinery is furnished for this purpose by a local tractor agency. In conducting this spring's tractor school the forestry staff of the university and field men from the tractor company will be assisted by two factory instructors, two logging engineers, one industrial engineer, one equipment engineer, and two service men.

New Hampshire Farmers Favor Adoption of Standard Grades for Maple Products

About 775,000 sugar maples are tapped each spring in New Hampshire, writes Extension Forester K. E. Barraclough. The sap from these trees yields about 230,000 pounds of sugar and 175,000 gallons of sirup, together worth about \$450,000. In February of this year Mr. Barraclough held nine meetings in different sections of the State for discussion of improved methods of producing maple sirup and sugar. Two hundred farmers who make sirup each spring attended the meetings. A farmer from Vermont who is a practical sugar maker described the methods used in making fancy sirup, the deputy commissioner of agriculture explained the Vermont maple sugar grades, and Mr. Barraclough made suggestions on the care of the sugar orchard. All the sirup producers attending the meetings indicated that they would like to have the State commissioner of agriculture establish voluntary standard grades for New Hampshire maple sirup and sugar similar to those already established in Vermont. Under these standards fancy sirup must be free from foreign material, weigh 11 pounds to the gallon, and be of a color no darker than No. 5, United States Color Standards. Grade A must be no darker than No. 7 and grade B no darker than No. 9.

Drought Relief Through Cash Purchase of Pulpwood

The Southern Advance Bag & Paper Co., Hodge, Jackson Parish, La., in its purchases of pulpwood is giving priority to farmers who suffered crop loss as a result of the prolonged drought of last year. This practice was adopted by the company under an agreement formed with Extension Forester Robert Moore and County Agent Leon Mitchell. Each farmer's application for priority requires the approval of Mr. Mitchell, and this is given only if the timber is in condition for cutting. The applicant must agree to cut the timber properly and to protect his woods from fire for

three years after the cutting. The company pays cash for the pulpwood and accepts delivery either at the mill or on a railroad siding.

In a letter recently circulated to all North Carolina county agents, Extension Forester R. W. Graeber listed 36 firms in the State that buy veneer logs and are willing to buy them direct from farmers. For about half the firms listed the letter gave information as to the kinds of logs purchased.

Arkansas foresters, lumbermen, bankers, business men, and farmers, and representatives of the Federal Government, took part with Extension Forester Charles A. Gillett as speakers in what Mr. Gillett called an extension school of forestry, held at Pine Bluff, Ark., December 11-12. Attendance totaled 250. Three half-day sessions of talks were followed by an inspection tour of wood-using industries of Pine Bluff.

Thirty-seven students representing 24 institutions are enrolled this year in the Yale School of Forestry. Twelve additional students are enrolled in the department of forestry of the Yale Graduate School.

A bus has been purchased by the North Carolina State College to transport forestry students over the 40 miles separating the George Watts Hill demonstration forest from the college and on trips to other points for study of forest conditions and logging methods. An assessment for this transportation, based on a charge of 1 cent per mile, is levied on each forestry student, and when the bus is not being used by the forestry department it is available to other departments of the college at that rate per passenger.

The board of education of the town of Trenton, Oneida County, N. Y., expects to begin planting a 126-acre school forest this spring. A tract of that size has been given to the board for reforestation purposes. The plan is to set out 12,000 trees each year. School district forests in New York on which planting was begun in 1929 or earlier number 120. Previously the largest tract dedicated to such use in the State was one of 98 acres in the town of Watson, Lewis County, where planting was started 10 years ago and the school children plant from 5,000 to 10,000 trees each Arbor Day.

First-year 4-H forestry club members planted 767,000 trees in New York State last year at the rate of 1,000 trees each. According to the estimate of Assistant Extension Forester J. E. Davis nearly 80 per cent of the trees survived the summer.

Forest Service Notes

Silvicultural Improvement Through Sales on the Front Range in Colorado

By M. W. THOMPSON, United States Forest Service

The forests of the Front Range in Colorado were drawn upon heavily in the old days, at the time when mining was being actively developed and the railroads were being built. Later a great deal of local timber was used in the development of agriculture in the region as well as in the settlement and building up of a large number of cities and towns. No organized fire protection was given to the forests until 1905. Prior to that time, fires that did not threaten improved property were permitted to burn unchecked until they were put out by natural causes. Serious fire damage occurred on many areas.

The characteristic fire reactions of the Douglas fir type, the lodgepole pine type, and the Engelmann spruce type are determined by the following facts: Douglas fir resists fire more successfully than the other principal species of the region, so that an occasional seed tree survives fire; lodgepole pine retains on its branches from year to year many tightly closed cones which open when subjected to the heat of fire, with the result that seed are scattered profusely over the burned area; Engelmann spruce is not resistant to fire and does not bear serotinous cones. In the Front Range the greatest lasting damage from fire occurred on large areas in the Engelmann spruce and subalpine types where the forest was so completely destroyed that even yet, after an interval of 60 years or more, it has not been fully reestablished. On practically all sites where lodgepole pine occurred dense stands of reproduction of this species followed the old fires. In the case of the Douglas fir type the damage done by early fires was not so permanent as in the case of the Engelmann spruce and subalpine types. On many areas conditions following the fires were very favorable for the reproduction of Douglas fir. This is shown by the very dense stands of trees of this species from 40 to 60 years old which occur on north and east slopes near the lower limits of tree growth throughout the Front Range. Except on portions of the higher, subalpine region mentioned, in fact, protection for a period of 25 years has resulted in a gradual restocking of timber in all types.

Most of the early cutting and most of the destruction by fire was concentrated on restricted areas near the centers of industrial and agricultural development. On some more remote areas extensive stands have become seriously overmature. Large quantities of sound, usable, dead timber remain on old burned-

over areas. In addition, many restocked areas are urgently in need of silvicultural improvement. These include badly crowded stands that need thinning and stagnant stands containing trees of mine-prop size that should be cut heavily. In short, there is an urgent need of silvicultural improvement throughout the Front Range. Such improvement, obviously, can take place only as fast as the market for forest products permits.

Ways in which this situation is being met on the national forests are typified by the following:

(1) In dense, pole-sized stands of western yellow pine on the Colorado National Forest, trees are being removed as a thinning and utilized for mine props and mine ties. These products are hauled directly to the coal mines in the vicinity of Boulder. Stumps are cut close to the ground and trees are utilized to a top diameter of about 4 inches. This results in a well-spaced stand of trees which should produce satisfactory saw timber.

(2) Stagnant stands of lodgepole pine on the Cochetopa National Forest are being clear cut where the trees are mature and thinned where they are immature. Tops are utilized to the 5-inch point and sometimes to 4 inches. The larger trees are utilized for saw logs, railroad ties, or telephone poles, and the smaller trees are used for telephone poles or mine props. Clear cutting is being followed by a complete natural restocking, and thinning leaves a stand that will provide satisfactory future cuts.

(3) In a mixed stand of white fir and western yellow pine on the San Isabel Forest, in which the trees are of comparatively small size, an improvement cutting is being made to remove the white fir. The product of this cutting consists entirely of mine props and mine ties. These are being hauled directly to the coal mines above Walsenburg. A satisfactory stand of western yellow pine that should produce railroad ties or saw logs remains after the cutting.

(4) Beginning about 10 years ago, progress has been made in thinning the dense stands of Douglas fir on the Pike National Forest. Some acres contain as many as 10,000 or 15,000 trees, generally not more than 30 feet tall and in a stagnant condition. This number is reduced to about 500 to 700 trees per acre. The trees that are suitable are used as Christmas trees. This business has gradually increased; in 1930 nearly 17,000 Christmas trees were obtained on the Pike. Recognition of the desirability of thinnings of this character has spread so that similar cutting is taking place on nearly every national forest in the region.

(5) A total of 13,778 acres on the Pike Forest has been successfully planted, largely with Douglas fir and

western yellow pine. Some of the earlier plantations, those now about 20 years old, have developed to the point at which thinnings are necessary. Accordingly, several thousand trees in these plantations are sold each year for use in ornamental planting. The largest number removed in any one year was the 17,745 sold in the spring of 1926.

(6) Partly as a result of the sale of planted trees for use as ornamentals, during the past few years a market has developed for wildings for ornamental planting. In fact, there is a keen demand for blue spruce and Rocky Mountain red cedar, especially for specimen blue trees of these species. There is also a call for trees of other species such as Douglas fir and western yellow pine and for various shrubs and hardy perennials. Trees to be dug are so chosen that their removal improves the spacing in the stands. This business has developed so that in 1930 more than 10,000 trees were dug on the national forests in the Front Range in Colorado. As in the case of Christmas trees, the call for such trees has spread so that sales of this class are made on nearly every national forest in the region.

(7) A good many sales of a salvage nature are being made in overmature stands of green timber. Also, dead timber is removed for fence posts and for fuel wood.

It is appreciated that the thinnings, improvement cuttings, and salvage sales that are being made on national forests in the Front Range in Colorado are rather limited in extent and are not of great importance from a public standpoint. However, desirable silvicultural practice is being followed, close utilization is being obtained, and trees and various timber products are being supplied, largely to a regional market. It seems obvious that demands will continue to increase, making it possible to extend the operations and so helping to restore the forests to a more productive condition.



Forage plants with which the Intermountain Forest and Range Experiment Station has obtained good results in artificial seeding work on areas at elevations of from 6,700 to 8,000 feet where annual precipitation ranged from 14 to 20 inches are yellow sweetclover, white sweetclover, crested wheatgrass, and violet wheatgrass. Hungarian brome and the native mountain brome will seed in the oak zone but not at the higher elevations. Yellow sweetclover formed a better stand than white sweetclover, bloomed 10 to 18 days earlier, and matured seed at elevations as great as 8,000 feet.



National-forest receipts for the period July 1-December 31, 1930, were \$2,474,644, which is \$770,519 less than receipts for the corresponding period in the preceding year. The decrease was principally in timber sales.

Erosion Studies Under Way in Southern Idaho

By F. G. RENNER, United States Forest Service

Southern Idaho has an acute erosion problem, largely because the soils of the region are composed mainly of loose, coarse granite sand. In 1929 a Forest Service survey covering 128,000 acres of the watershed of the south fork of the Boise River showed that only 27 per cent of this area was not eroded. Much of the land that had escaped erosion was protected by dense brush and was inaccessible to stock. Of the total area 17 per cent was badly gullied. Lands that had lost a large part of their upper soil layer and had been subjected to widespread sheet erosion made up 56 per cent of the total. According to estimates of engineers connected with the local irrigation project, erosion has reduced the storage capacity of the Arrowrock Reservoir by from 7,000 to 8,000 acre-feet, and accumulations of sand and erosion debris below the diversion dam have reduced the efficiency of the reservoir's power plant by 25 per cent. These accumulations have occurred in spite of costly annual attempts to sluice out the reservoir, river channel, and diversion canals.

In an effort to check erosion and prevent further depletion of the vegetative cover, since 1924 the number of livestock grazing on the watershed has been reduced by 45 per cent. It now appears that this reduction has not kept pace either with soil losses or with cover depletion, and that thorough-going, detailed experimental work, carried on over a number of years, will be necessary to determine the management requirements of soil, timber, and forage.

Experimental work on several phases of the problem has been started by the Intermountain Forest and Range Experiment Station. Many profile surveys showing elevations to one-thousandth of an inch have been established on selected sites over the drainage. Periodic rechecking of these surveys is expected to furnish very accurate data on the movement of the soil and changes in the degree and rate of erosion. One hundred plots varying in size from 1 square meter to 2 acres have been established for the purpose of studying in detail the relation of type and density of vegetation, slope, soil characteristics, the action of rodents, and other factors to erosion.



Fires on the national forests in 1930 burned over eleven-hundredths of 1 per cent of the gross area of the forests. The gross national-forest area burned over during the year totaled 205,781 acres. Both man-caused fires and lightning fires occurred in greater numbers than in 1929. The increase in the number of fires was confined to the East, the number of fires on western national forests being less than in 1929.

Christmas Tree Production Methods to be Tested on Chippewa Forest

By HOWARD HOPKINS, United States Forest Service

Last year forest officers on the Chippewa National Forest, Minn., made an extensive survey of Christmas-tree markets in the Central States. The results indicated that most of the Christmas trees sold in the region are shipped in either from New Hampshire and Vermont or from the even more remote Douglas fir region of the Pacific Northwest. At the same time thousands of acres of land in the Lake States admirably suited for the production of spruce or fir Christmas trees is being ignored as of no value. As the first step in determining the possibilities of profitable production of Christmas tree crops on the Chippewa, in the Christmas season of 1930 more than 3,000 balsam fir and black spruce trees averaging from 4 to 6 feet in height were sold on the stump. In general the cutting of these trees resulted in stand improvement, the trees being removed either from an undesirable understorey or in the form of a needed thinning. The price received by the forest averaged more than 5 cents per tree.

As a demonstration forest the Chippewa will not be satisfied with increasing sales of this nature. It will also establish on various sites plantations of white spruce, black spruce, and balsam fir from which trees may be taken for the Christmas market both as the main crop and as a side crop in connection with pulpwood production. Another suggested method of Christmas-tree production is to use for this purpose the tops of trees cut for pulpwood. The objection has been raised that the limbs of older trees are too brittle to permit bending and packing as Christmas trees. A solution of this difficulty will be sought in experiments on the Chippewa. Still another method, which has worked out very successfully in small-scale operations on national forests of the Southwest, is to lop the tops from standing trees, leaving the tree standing. The full root system of the lopped tree rapidly sends out a new shoot which usually develops to Christmas-tree size within a very short time.

In connection with tests of these different ways of producing Christmas trees the Chippewa will keep careful records of costs and returns. As the best and most profitable methods of handling such a crop are indicated the information will be broadcast so that private landowners may profit by the experiments and experiences on Government land. On the Chippewa Forest the stumpage value of a Christmas tree 4 to 6 feet tall is often equal to the stumpage value of a two-bolt tree 30 to 50 feet high. Many thousands of acres of land now idle in the Lake States is suitable only for the production of slow-growing black spruce trees. If the Chippewa Forest demonstrates that it can raise in 20 or 30 years Christmas tree crops equal in stumpage value to pulpwood the growing of which would require

100 years, it may cause many abandoned acres to be brought into profitable use.

Effect of a Single Winter Fire on Planted Slash Pine

By PHILIP C. WAKELEY, United States Forest Service

In January, 1930, a fire ran through half of a 10-acre slash pine plantation on an old field in Jackson County, Miss. The trees were spaced 6 by 8 feet. At the time of the fire they were four years in the field and five from seed, and were large enough to be past the worst danger from burning. The plantation contained a small percentage of loblolly pines a year younger than the slash pines, planted to fill gaps caused by the death of slash seedlings during their first season in the field. The ground cover consisted mostly of broom sedge and blackberry vines. The fire was hot enough to defoliate most of the slash pines and kill all the loblolly pines. In October, 1930, one full growing season after the fire, a crew from the Southern Forest Experiment Station and the Mississippi Commission of Forestry studied the plantation to learn the exact effect of the burn.

On the unburned half of the plantation the survival of the original slash pine planting, as shown by a count of 1,000 seedlings, was 70.5 per cent. On the burned half the survival of the slash pine, similarly determined, was only 62.3 per cent. The difference of 8.2 per cent in survival at the end of the fifth year is directly attributable to the burn; a statistical measure known as the standard deviation of the difference shows that in the present instance there is only one chance in a hundred that the difference is due to an error in sampling.

The average height of the slash pine on the unburned half, as determined by measuring 300 trees, was 12.4 feet. The average height on the burned half was only 11.2 feet, or 1.2 feet less, a difference which analysis shows could not within reason be attributed to errors in sampling, but only to the effect of the fire. This difference of 1.2 feet, it should be remembered, showed up in the course of only one season's growth; that is to say, the fire caused a loss of 1.2 feet out of about 4 feet of potential growth.

The accurate records and consistent data available concerning this plantation make the results of the fire-damage study particularly clear-cut and dependable. It is evident that even a winter fire in an open stand of slash pine 8 to 9 feet high, although it may not make a hopeless wreck of the stand, is apt to kill practically one-tenth of the trees and to reduce the following season's height growth of the survivors by 25 per cent or more.



An act approved January 26 enlarged the Ashley National Forest, Utah, by 38,000 acres. The lands added lie north of the Wyoming State line and are known as the Fort Bridger Addition.

Forest Service Appropriation Increases for 1932

The agricultural appropriation act for 1932 makes \$16,954,620 available to the Forest Service, exclusive of forest road and trail appropriations, receipt funds, and special items. This represents a total increase of \$1,040,970 over the appropriations for the preceding fiscal year. Some of the increases included in this total are \$90,000 for fire-protection improvements on the national forests, \$42,160 for additional forest guards and fire-fighting equipment, \$25,000 for forest planting, \$24,000 for administering timber-sale business, \$20,000 for administering and protecting lands being purchased for national-forest purposes, \$20,000 for blister-rust control in Idaho, \$20,000 for administrative improvements on the national forests, \$20,000 for range improvements, \$10,000 for sanitary improvements and fire-preventive measures on public camp grounds on national forests, \$10,000 for grazing administration, \$9,940 for timber surveys and range reconnaissance, \$8,000 for general surveys and maps, and \$8,000 for control and regulation of recreation areas.

For cooperation with States in protecting State and privately owned forest lands from fire \$74,800 more is provided than in the appropriation act for 1931.

Appropriations for research projects include increases totaling \$211,800, distributed as follows:

Forest management research:

Pacific Northwest Forest Experiment Station, determination of the best methods of preventing and suppressing forest fires	\$15, 000
Northern Rocky Mountain Forest Experiment Station, determination of the best methods of preventing and suppressing forest fires.....	15, 000
Northeastern Forest Experiment Station—	
Forest planting investigations.....	10, 000
Study of growth and yields of the northern hardwoods.....	10, 000
Southwestern Forest Experiment Station, for investigations of methods of insuring natural reforestation in Douglas fir and western yellow pine forests....	2, 660
Lake States Forest Experiment Station, for a study of reforestation in North Dakota and adjacent Plains States....	15, 000

Range investigations:

Southwestern Forest and Range Experiment Station—	
For studies of the relation of water to damage by sheep to western yellow pine reproduction.....	7, 120
For studies of ways and means of restoring range revegetation on southwestern sand dunes and denuded gravelly ridges.....	7, 120

Range investigations—Continued.

California Forest Experiment Station—	
For studies of range management in the California pine types.....	\$10, 000
For studies of range management in the foothill winter ranges.....	10, 000
Range utilization research in cooperation with the United States Range Livestock Experiment Station, Miles City, Mont.....	10, 000
Forest survey:	
Southern Forest Experiment Station.....	40, 000
Northern Rocky Mountain Forest Experiment Station.....	20, 000
Forest survey research and administration, advance assignments.....	14, 900
Forest economics, for developing plans for handling the new public domain.....	25, 000
Soil erosion investigations.....	70, 000

For completing the construction of the new building for the Forest Products Laboratory \$700,000 was appropriated.

Of the amounts included in the 1932 act the following were made immediately available on passage of the act, as a measure for unemployment relief: For sanitary and protective improvements, \$40,000; for blister-rust control, \$45,000; for protective, administrative, and range improvements, \$495,200. Emergency appropriations designed to relieve unemployment and meet urgent needs of the Forest Service were as follows: For construction of forest roads and trails in 1931, \$3,000,000; for administrative and protective improvements, \$254,800; for insect control, \$100,000; for blister-rust control, \$150,000.

The emergency forest highway fund of \$3,000,000 has been programmed to projects in all the 32 States containing national forests.

The regular forest highway fund for the fiscal year 1932 amounts to \$9,500,000. This amount, as apportioned to national forest States by the Secretary of Agriculture, has been programmed to practically all the States containing national forests. Cooperative agreements, plans, and estimates for the work on which this fund is to be expended are being rushed with the purpose of relieving unemployment.

Three New National Forests in Upper Michigan

The Hiawatha, Marquette, and Ottawa National Forests have recently been created in the Upper Peninsula of Michigan. The Hiawatha Forest comprises the lands formerly designated as the Mackinac purchase unit, lying in Alger, Schoolcraft, and Delta Counties. It has a gross area of 270,071 acres, of which 178,564 acres is still in private ownership. The Ottawa Forest, formerly the Keweenaw purchase unit, is located in Houghton, Iron, Ontonagon, and Gogebic

Counties. Of its gross area of 252,551 acres only 80,059 acres has been acquired or is in process of being acquired by the Government. The Marquette Forest, formerly the Marquette purchase unit, in Chippewa County, has a gross area of 275,986 acres, of which the Government owns or is acquiring 109,223 acres.

These three new forests will all be under the management of one supervisor, with headquarters at Munising. Ranger stations will be at Munising, Raco, and Kenton.

California Station Conducts Controlled Experiments Bearing on Stream Flow and Erosion

The effect of forest litter upon surface run-off is due almost entirely to the effect of the litter in maintaining maximum water-percolation capacity in the soil profile underlying it, according to preliminary findings in studies now being conducted by the California Forest Experiment Station. The water-absorptive capacity of the litter itself contributes very little to this effect. When the litter is removed surface run-off is increased from 3 to 60 times, according to the character of the soil and the intensity of precipitation, and the solid matter eroded by the run-off is increased from 50 to 6,000 times. Soil texture is more important than gradient in determining the relative quantity of run-off from bared soils; but the gradient directly affects the quantity of material eroded, the latter increasing markedly as gradients go above 15 per cent. With intensities of rainfall below 0.5 inch per hour the condition of the soil surface has little influence upon run-off and erosion in the soils thus far studied; but surface run-off resulting from rainfall having an intensity as great as 1 inch per hour increases rapidly, and the erosion effect of such run-off increases enormously, on soil surfaces that have been bared. This is due to the fact that the impacting raindrops pick up fine particles from bared soil surfaces and that the absorption of silt-laden water progressively clogs the percolation channels in the soil.

In its work relating to stream flow and erosion the California station is carrying out a series of controlled experiments, making use of rectangular tanks containing soils placed layer by layer in the same order in which they occurred in nature. Paired tanks contain the same kind of soil with different conditions in respect to cover, or soils of different classes and kinds under the same sort of cover. The first phase of these experiments has to do with the distribution of precipitation through run-off and percolation and with the erosion accompanying run-off. The second phase is ecological study of vegetative succession as affected by disturbances such as fire, grazing, and lumbering. The third has to do with the water requirements of different plants and vegetative types under normal conditions and as affected by disturbances. It may be remarked that since in southern California the total precipitation

is inadequate to meet human needs it is a matter of special importance there to know whether a given vegetative type conserves more soil moisture than it utilizes and how it compares in this respect with other types.

The results from these controlled experiments are being checked against results obtained on field plots so established that the precipitation received upon them and the run-off and erosion from them can be accurately measured.

Experimental results thus obtained are to be applied to paired watersheds, first small ones on which conditions can be kept fairly simple and then larger ones. On one watershed of each pair so used the vegetative cover will be maintained as nearly unbroken as possible; the other will be thoroughly denuded of such cover. In cooperation with engineers, tests will be made of different methods of measuring the silt load of waters and of determining the relation of silt deposit in reservoirs to vegetative conditions and disturbances on the tributary watersheds. Finally, the station will study problems involved in managing the vegetative cover on watersheds so as to control erosion and make possible more complete utilization of precipitation. Experiments of this last group will have to do with forest planting, control of fire and grazing, and co-ordination of the management of vegetative cover with engineering works.

Purchase of 254,000 Acres of Land for National Forests Approved

The National Forest Reservation Commission at its meeting of February 25 approved a purchase program involving 290 cases in 19 States, with an aggregate acreage of 254,022. The prices approved averaged \$4.67 per acre, totaling \$1,186,159. The lands are located in 26 separate purchase units, the effective administration of which will be markedly promoted by these purchases. The largest single purchases approved at this meeting are 63,147 acres in the Homochitto unit, in Mississippi; 31,228 acres on the Green Mountain National Forest, in Vermont; 31,110 acres on the Nantahala National Forest, in Georgia and the Carolinas; 27,000 acres on the Ottawa National Forest, Mich.; 21,156 acres on the Pisgah National Forest, N. C.; and 17,131 acres on the Allegheny National Forest, Pa.

A question left over from a previous meeting of the commission had to do with the propriety of the prevailing policy of accepting lands subject to reservations or exceptions of mineral rights in cases in which the vendors were unwilling to relinquish such rights for the prices the United States was willing to pay for the lands. After a discussion of the legal and administrative aspects of the situation the commission decided that it would continue to acquire lands subject to mineral reservations or exceptions where such reserved

rights did not impair the value of the lands for stream-flow protection or timber production.

Another question considered was that of initiating purchase work in the new Green Mountain unit in southern Vermont. The lands in this unit are well timbered and therefore have a higher average value per acre than the lands hitherto acquired or subject to purchase in other units. The discussion led to approval of the purchase of eight tracts of land containing 31,228 acres at an average price of \$11.02, or a total cost of \$344,075.50. These lands form a relatively compact unit, are of high forest quality, and support excellent stands of timber providing a splendid opportunity for early initiation of intensive silvicultural management.

A proposal to establish three new purchase areas in Wisconsin and to make a substantial addition to the existing Oneida purchase unit in that State was considered. The commission withheld approval pending study of the purchase program in all regions east of the Great Plains and a final determination as to its most urgent requirements.

The commission abolished the original Vernon purchase unit in southern Louisiana, where purchases hitherto have proved impracticable, and established instead of it a new Vernon unit of approximately the same area situated 30 miles or so to the southeast of the original area.

Map Locates Black Walnut Plantations in Central States

A map recording the location of black walnut plantations in the Central States has been prepared by L. F. Kellogg, of the Central States Forest Experiment Station. The map shows all plantings discovered in the course of the station's field work, as well as those for which records existed in the files of State foresters, forest schools, and the United States Forest Service. The map is on a scale of 24 miles to the inch. It is available for reference only.

The map shows a concentration of plantations in central Illinois, a rather general scattering of planted groves over Iowa, and a relatively infrequent occurrence of plantings in Indiana, Ohio, and Kentucky. Records for northern Missouri are very incomplete. In Illinois and Iowa the areas on which walnut plantations are most numerous practically coincide with the regions of open prairies. This fact substantiates the conclusion, drawn from examination of about 300 individual plantations, that these groves were established in order to provide man and beast with protection from the wind. In relatively few cases was timber growing the principal motive. Though largely intangible, the benefits of these groves have been very great.

It is expected that the station will develop similar maps showing the extent to which other forest tree species have been planted in the Central States.

Unemployed Cut Fuel Wood on Pisgah National Forest

By J. H. BUELL, United States Forest Service

Cutting of firewood on the Bent Creek tract of the Pisgah National Forest, near Asheville, N. C., is helping to solve the problem of unemployment in the city of Asheville and in Buncombe County. The cutting also constitutes an unexpected and material advance in experimental work conducted on the tract by the Appalachian Forest Experiment Station.

During the past summer trees were marked for three different experimental cuttings on the Bent Creek experimental tract, but no sale could be made. It began to look as if there would be no chance to get the trees cut before spring. Then, about the middle of December, came the application of the wood-yard committee of Asheville's Employment Council for firewood that could be had for the cutting.

Work was begun at once. Between December 15 and February 1 some 1,100 unemployed men of Asheville were aided, and 300 cords of wood were brought into the city and sold. To each man working three days in a week either in the woods or at the wood yards the wood-yard committee is giving a week's supply of food for his family. About 50 men are employed each day at Bent Creek. The wood is cut into 8 or 10 foot lengths before it is hauled to town. Two wood yards have been established, one of them in the Y. M. C. A. football field. At the wood yards 100 men are kept busy sawing the wood to stove lengths and splitting it to order. The wood is delivered throughout the city at \$5 per cord. The county is furnishing mule teams to do the skidding in the woods and trucks to haul the cordwood to Asheville. The city is supplying trucks to deliver the firewood in town.

The whole plan is working splendidly. All the charitable organizations in the city have taken part in the work. One of them sponsored the auctioning of a cord of wood that had been on display in the center of town for several days. It brought \$50. The local newspapers have been carrying stories to explain the work of the community wood yard and to create a market, at the low price of \$5 per cord, for fuel wood which would usually retail at \$8 to \$10. Support for the project has been solicited from the pulpits of local churches. Women's organizations have volunteered to prepare noonday lunches for the workmen and to help in giving out supplies at the end of the day. Through the wood yard the city has avoided the soup kitchen and the bread line and has thus preserved the morale of its unemployed.

From one unit of 11 acres marked for a silvicultural improvement cutting 61 per cent of the timber by cubic volume was removed. On a unit of 9 acres where only the saw timber was marked, 53 per cent of the cubic volume will be cut. Cuttings on the forest will be continued until April.

Handles used in axes to be placed in tool caches on the Angeles National Forest, Calif., last year were boiled in linseed oil in order to drive out all moisture and shrink the wood. The axes were hung before the handles were treated. After the boiling the wedges were tightened. A great many of the axes were exposed to high temperatures and low humidity throughout the summer season. In the fall practically every ax was found to have remained tight on its handle. Previously, serious difficulty had been experienced on the Angeles in getting ax handles to stay in the axes,

especially in those stored in hot, dry tool boxes for the summer season.



Headquarters of the Appalachian Forest Experiment Station and the Pisgah National Forest, and those of the Federal district forest inspector and the State district forester, have been established in the new Federal building at Asheville, N. C., by transfer from the Asheville city hall.

General Forest News

Cyclone Spark Arrester Passes Test with Perfect Grade

The cyclone spark arrester, developed in the Missoula, Mont., shops of the Northern Pacific Railway, has been found to prevent the emergence of live embers from a locomotive much more efficiently than a wire netting front-end spark arrester such as has heretofore been used by the local division of the road. The new device operates on the same principle as the cyclone separator. The cinders are separated from the gases and are worn down until they become light enough to reenter the gas stream as it escapes from the stack.

On September 15, 1930, a test run was made from Missoula to Blossburg, a distance of 98.8 miles, in order to compare results obtained with the cyclone spark arrester and those obtained with the master mechanic front-end spark arrester of 6 by 6 woven-wire netting. A freight train of 81 cars carrying 3,691 tons was made up. An engine equipped with a cyclone spark arrester was coupled to its head end, and 10 car lengths back an engine equipped with a master mechanic front end was coupled in. The coal used in both engines was the very light Rose Bud lignite variety, which has been found to be especially apt to give off dangerously hot cinders through the stack. On the tops of the second, third, and fourth cars back of each engine were placed boxes, made of light lumber, the bottoms of which had been covered with paper toweling fastened down by means of thumb tacks. The boxes were 5 feet long and 11 inches wide, with 8-inch sides and ends and with four 1 by 1 inch baffles placed at uniform intervals on the bottom of each. At a given signal the toweling was exposed for 4 minutes by lifting canvas covers from the boxes. Fresh paper was placed in the boxes after each exposure. Ten exposures were made at various air temperatures and humidities, in winds of varying velocity and direction, and over sections of track varying in curvature. As a result 131 holes and spots were burned in the test paper on cars immediately behind the engine equipped with the master mechanic front end. Cinders from this engine also burned several holes in the

clothing of the men on the cars and started one fire on the right of way. Simultaneous exposures of paper on cars immediately behind the engine equipped with the cyclone spark arrester did not result in a single burned hole or even in a charred spot.

John McLaren, fire-control inspector of the United States Forest Service at Missoula, describes the cyclone spark arrester as follows:

The device is simple and consists mainly of a cylinder made to center below the tip of the exhaust nozzle and to fit snugly around the submerged portion of the smokestack and the exhaust nozzle with a flanged opening at the front. Material coming through the flues from the fire box strikes the outer wall of the cylinder and, after rebounding more or less, passes under the cylinder and up into it through an opening placed tangentially so that material entering the cylinder starts a circular motion without an abrupt change in direction. Once inside, the material continues to rotate against the inner surface of the cylinder and is literally ground down to the size of coarse sand before it enters the gas stream, then escapes to the atmosphere through the submerged smokestack, which extends over and down to within approximately 12 inches of the tip of the exhaust nozzle.

During the past year or so the western Montana division of the Northern Pacific Railway has installed spark arresters of the cyclone type in nearly all its engines.

Two More Lupines Found Poisonous to Livestock

Lupinus laxiflorus and its variety *silvicola* are definitely poisonous to cattle, the Bureau of Animal Industry has found through feeding tests. When nearly mature fruit of the latter was fed to cattle, horses, and sheep at Saliua, Utah, it proved particularly dangerous to cattle. It had slightly less effect on horses and was only about one-tenth as toxic to sheep as to cattle. Cattle and sheep fed with samples of *Lupinus laxiflorus* obtained from a pasture in Sherman County, Oreg., developed symptoms resembling those produced by the variety *silvicola*. The bureau is endeavoring through further study to determine more

exactly the importance of these lupines as stock-poisoning plants.

At least one dozen species of lupines native to the Western States had previously been recognized as poisonous to livestock.

Parasite Gains on Tip Moth in Nebraska Plantations

Apparently an end of hard times is in sight for plantations of western yellow pine and jack pine on the Nebraska National Forest, Nebr., which have suffered severely as a result of heavy tip-moth infestation. The change is attributed to the parasite *Campoplex frustranae*, liberated in the plantations in 1925 by L. G. Baumhofer, of the United States Bureau of Entomology. Conditions on certain plots were recently recorded as follows:

Western yellow pine, 2-1 stock, 1915 planting adjacent to Campoplex release plot

Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested	Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested
1925-----	37.3	5.3	86	1928-----	51.1	6.2	69
1926-----	44.6	7.3	92	1929-----	61.7	7.6	33
1927-----	47.9	3.3	88	1930-----	72.5	10.8	15

Jack pine, 2-0 stock, 1921 planting, three-eighths to one-half mile east of Campoplex release plot

Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested	Year	Average height (inches)	Average height increase (inches)	Percentage of leaders infested
1926-----	40.4	12.8	96	1929-----	81.6	14.5	30
1927-----	51.5	11.1	87	1930-----	104.7	23.1	35
1928-----	67.1	15.6	84				

On a western yellow pine plot 2 miles west of the parasite release area the decrease in infested leaders has been from 97 per cent in 1927, the worst year, to 72 per cent in 1930.



Some 3,859,000 trees on the Beaverhead National Forest, Mont., were attacked by the mountain pine beetle during 1930, according to the results of a survey by A. L. Gibson, of the United States Bureau of Entomology. This is 1,353,000 more trees than were estimated to have been attacked by this insect on the Beaverhead in 1929, and brings the total so attacked on that forest in the past four years to 7,000,000. The infestation spread to the Beaverhead from the Bitterroot and Salmon National Forests.

Nomenclature at the Fifth International Botanical Congress

By A. S. HITCHCOCK, United States Bureau of Plant Industry

In advance of the fifth meeting of the International Botanical Congress, held at Cambridge, England, in 1930, that body's committee on nomenclature received no less than 20 sets of proposals for modifying the International Rules of Botanical Nomenclature. The most elaborate of these proposals came from a committee of British botanists. The proposals were printed in a pamphlet of 204 pages. They formed indeed a complete revision of the rules, together with additional nomina conservanda, a proposal list of the standard species of Linnaean genera prepared by A. S. Hitchcock and M. L. Green (Kew), and other matters. All these proposals were brought together and codified by John Briquet (Geneva), chairman of the committee. They were then printed in a *Recueil Synoptique* giving in parallel columns first the articles of the present rules and second the various proposed revisions. This pamphlet, known as the blue book, consisted of 142 pages. It was distributed to the members of the international committee, who voted on the proposals. The votes of the committee were returned to Doctor Briquet, who brought the results together in the *Avis Préalable* (the "yellow book"), a pamphlet of 27 pages. At the sessions of the section on nomenclature the yellow book was the basis for discussion. Nomenclature was considered at half-day sessions throughout one week and at one full-day session. The results will be published as soon as possible.

The most important action resulting from these sessions was the appointment of an International Committee on Nomenclature, including representatives of all countries publishing on systematic botany. The American members are Barnhart, Fernald, Hitchcock, Jepson, Maxon, Merrill, and Rehder. In order to facilitate the business of the committee an executive committee was appointed consisting of Barnhart, Harms, Janchen, Maire, Ramsbottom, Rehder, and Sprague. This committee is to act on lists of nomina conservanda and several other matters referred to it by the congress. It also will recommend proposals to be presented at the sixth congress, to be held at Utrecht in 1935.

A few of the more important decisions of the Cambridge congress relating to nomenclature are as follows:

The requirement of a Latin diagnosis in publishing new groups was retained. Names published up to 1932 without a Latin diagnosis were validated.

The type concept was to be incorporated into the International Rules of Botanical Nomenclature.

Later homonyms were rejected except as later generic homonyms should be conserved.

The original spelling of names was retained.

The principle of conserved specific names was rejected.

The first international code of botanical names was the Laws of Botanical Nomenclature adopted at the first International Botanical Congress, held in Paris in 1867. At the second congress, held in Vienna in 1905, another code (International Rules of Botanical Nomenclature) was formulated, based on the Paris code but modifying it considerably. At the Brussels congress, in 1910, the Vienna code was somewhat amended but not much changed. At the fourth congress (International Congress of Plant Sciences), held at Ithaca, N. Y., in 1926, no legislative action was taken, but the committee on nomenclature which served on the occasion of the Cambridge congress was appointed. This committee consisted of the following: J. H. Barnhart (New York), G. Bitter (Göttingen) (deceased), J. M. Black (Adelaide, South Australia), A. de Degen (Budapest), E. de Wildeman (Brussels), L. Diels (Berlin), K. Domin (Prague), B. Fedtschenko (Leningrad), A. S. Hitchcock (Washington), A. Jaczewski (Moscow), J. Janchen (Wien), H. Lecomte (Paris), H. Lindberg (Helsingfors), R. Maire (Algiers), C. E. Moss (Johannesburg, South Africa), S. Murbeck (Lund), T. Nakai (Tokyo), C. Ostenfeld (Copenhagen), J. Ramsbottom (London), B. L. Robinson (Cambridge, Mass.), H. Schinz (Zürich), C. L. Shear (Washington), T. A. Sprague (Kew), A. Trotter (Firenze), A. Valetton (Leyden), and the four members of the permanent committee on nomenclature, John Briquet (Geneva) (chairman), H. Harms (Berlin) (vice chairman), L. Mangin (Paris), and A. B. Rendle (London).

Funds for the use of the international committee on nomenclature were solicited in the United States by a committee appointed by the National Research Council. This group placed at the disposal of the international committee about \$3,000 received from institutions and individuals.

New Arboretum at Cleveland Provided for by Gift to Museum

A 100-acre tract of land on Sperry Road, near Kirtland, Ohio, has been given to the Cleveland Museum of Natural History for development as an arboretum. The donors are Mr. and Mrs. Benjamin Patterson Bole and their son, Benjamin Patterson Bole, jr. To develop the new arboretum, which will be known as the Holden Arboretum, the museum will have the larger part of the income from the Elizabeth Davis Holden memorial fund, established by the late Albert F. Holden, Mrs. Bole's brother. Mr. and Mrs. Bole have given the museum an option to buy additional lands on the basis of present values, and will provide funds for preparing the program of the arboretum. The gift and the plan of cooperation between the museum and the trustees of the Holden estate were announced at a dinner in celebration of the tenth anniversary of the establishment of the museum.

Selective Cutting on Little Falls Watershed

By R. R. FENSKA, New York State College of Forestry

A logging operation managed according to forestry principles has just been completed on the 4,003-acre municipal forest of Little Falls, N. Y. The operation brought the city a return of \$19,226 over and above all expenses. Yield predictions based on growth studies indicate that a similar quantity of timber may be cut from the tract 25 or 30 years from now.

The Little Falls municipal forest is situated on the watersheds of Spruce and Beaver Creeks, from which the city obtains its water supply. It was acquired by the city through a series of purchases dating from 1896.

In 1926 a cruise of the property showed that the 2,100 acres on the Spruce watershed contained nearly 5,000,000 feet of merchantable timber that could be removed with silviculturally desirable results. About two-thirds of this timber was beech, birch, and maple; the remainder was red spruce, balsam fir, and hemlock. The timber was marked for logging under a system of selective cutting. This was so planned as not to jeopardize the influence of the forest in regulating water supply.

The first logs were cut during the winter of 1927-28. Cutting was completed in 1929-30, but on account of poor logging conditions at that time some of the logs could not be hauled away until the winter of 1930-31.

During the first two seasons tractors were used to haul the logs the entire distance of 15 miles to the mill. The route ended with 6 miles of State highway. In the third season the logs were hauled with tractors for the first 9 miles, then reloaded to auto trucks for the haul over the State highway. While tractors were being used for the entire haul, two trips per day was a fair average with about 4,000 board feet, log scale, for each tractor load. By reloading to trucks for the last 6 miles, hauling was speeded up enough to effect a saving of \$6 per 1,000 board feet. Logging costs on the operation were as follows:

<i>Seasons 1927-28 and 1928-29</i>		Per 1,000 board feet
Felling, log making, skidding (horse), and road making.....		\$12
Hauling 15 miles with tractors.....		20
Stumpage.....		5
Total cost at mill.....		37
<i>Season 1929-30</i>		
Felling, log making, skidding, and road making.....		\$12
Hauling 9 miles with tractors.....		10
Hauling 6 miles with auto trucks.....		4
Stumpage.....		5
Total cost at mill.....		31

Labor averaged about \$3.50 per day, exclusive of board.

The hardwood logs averaged 10 per 1,000 board feet by the Scribner Decimal C rule, the softwoods 22. Of the total cut, by actual log scale, hardwoods composed 64 per cent and softwoods 36 per cent.

Owing to the character of the topography, this was a difficult logging operation, and the cost was somewhat higher than average.

Forestry and Game Management in Southern Mississippi

By PHILIP C. WAKELEY, United States Forest Service

For 14 years W. W. Kurtz has been developing 2,000 acres of turpented and largely cut-over pine land in Greene County, southern Mississippi, with the main purpose of building up a quail preserve especially adapted to field trials. In planning to make the property pay he early decided on timber and crude gum as his cash crops. Mr. Kurtz has been eminently successful both in increasing the stock of quail and in obtaining a satisfactory income by conservative working of his woodlands. Protection against fire has been the foundation of his success, but the details of his operation are at once so unusual and so effective that no forester or game manager passing near the tract should neglect an opportunity to observe them at first hand.

Mr. Kurtz's first move was to fence a small area and stock it with cattle, one cow to about 4 acres year long, to wear down the rough and reduce the fire hazard. A burned firebreak protected the pasture. Instead of making the break outside the fence where it would become rough again within the year, Mr. Kurtz made it inside, where the cattle would concentrate on it in the spring and keep the grass down.

After protection was established the grazed area came in first to lespedeza, which is fine forage and excellent quail feed, and soon afterwards to slash pine. As the herd increased and as the slash pine shaded out the grass, Mr. Kurtz fenced additional areas of cut-over land and reproduced slash pine on them in turn by using his cattle to wear down the rough. Meanwhile he chipped young and old trees on other parts of the property and cut old boxed trees for lumber, selling crude gum and logs at near-by stills and mills. Now, 14 years after his start, he is chipping slash pine trees at a profit on what was originally the treeless portion of his first protected pasture. The number of quail has increased enormously, thanks to the abundant food on newly protected areas, fields, lanes, and fences, and to the good cover afforded by the young pine thickets.

The heavy stocking of the pastures (one cow to 4 acres) necessitates the raising of some field crops to supplement the range. Mr. Kurtz raises also a great variety of garden crops and fruit, canning much of the surplus, and buys almost no food. He sells no farm produce. The cattle are merely a link in the

chain. Aside from furnishing a moderate quantity of food for the family, they serve solely to reduce the fire hazard and to help obtain pine reproduction. Gum and timber are the only cash crops, and they pay well.

Mr. Kurtz's mailing address is State Line, Miss., but his place is most easily reached from Leakesville, Greene County, Miss., 10 miles to the south. He is keenly interested in up-to-date agriculture, in practical forestry, in all forms of game management, and in field trials.

This operation was first brought to the attention of the Southern Forest Experiment Station by K. E. Kimball, of the Mississippi Commission of Forestry.

Petrified Forest Monument Enlarged

A presidential proclamation of November, 1930, added approximately 11,010 acres of land to the Petrified Forest National Monument, Ariz., making its area total 36,918 acres. As enlarged the monument includes more than half of an area in excess of 100 square miles that is covered by fragments of petrified trees estimated to be 200,000,000 years old. After these trees had drifted down some prehistoric stream to their present location, become waterlogged, and sunk, thousands of feet of sandstone was formed over them, geologists explain, with the result that the wooden trunks were metamorphosed into masses of agate and carnelian. A slow upheaval of the land, and subsequent erosion, finally exposed the petrified logs.

Mount Rainier National Park, Wash., has been enlarged by about 34,000 acres, through an act of Congress approved January 31. Changes in the southern and eastern boundaries add to the park a portion of the summit of the Cascade Range and other scenic features, and make Chinook Pass the park's eastern gateway. Through this pass will run the new road connecting Yakima and Seattle.

A regional plan of organization has been adopted by the Bureau of Biological Survey for its pest-control work. Field workers of the bureau who are engaged in cooperative campaigns for the control of injurious rodents and predatory animals are now grouped in four regions, constituted as follows: Region 1, all States east of the Mississippi River, including all of Louisiana; Region 2, Montana, Wyoming, South Dakota, Colorado, and Utah; Region 3, Washington, Oregon, Idaho, Nevada, and California; Region 4, Arizona, New Mexico, Oklahoma, Arkansas, and Texas. The four regional supervisors and their headquarters are as follows: James Silver, Washington, D. C.; Leo L. Laythe, Denver, Colo.; Ira N. Gabrielson, Portland, Oreg.; and Don A. Gilchrist, Phoenix, Ariz.

Foreign Notes

Pinus Radiata as Structural Timber

(From the Australian Forestry Journal, December, 1930)

Many are aware of the unpromising start made in the utilization of the plantations of *Pinus radiata* or *P. insignis* as it was called. Cut first at a time when softwoods were in great demand but were almost unobtainable, it was rushed on to the market without any attempt at seasoning, and naturally was most unsatisfactory in its behavior.

The woods and forests department of South Australia profiting by this initial experience has set itself out to live down this prejudice, and by maintaining sound seasoning and utilization methods to demonstrate the true worth of the product from the extensive *P. radiata* plantations. Kiln dried floorings, lining, and weatherboards now enjoy an excellent reputation based on their inherent worth and are recognized as being far superior to the Baltic they are replacing. Scattered almost throughout the State, there are houses and buildings framed, sheathed, floored, ceiled, and lined wholly with *P. radiata* with the exception of hardwood floor joists and stumps. These are a perfect testimony of the value of this timber for general building uses.

The faith of the department has, however, gone further and has been justified. With the exception of hardwood stumps the new Mt. Burr sawmill building has been built entirely of sawn *P. radiata*. To build a sawmill of the class of timber to be converted is so usual as not to be worthy normally of comment. But this mill is something more than an ordinary bush sawmill. The plant is of a type unique in the Southern Hemisphere.

The first feature of note is the use of the modern Swedish gang saw for converting the comparatively small logs directly in one operation to unedged boards. One gang saw is being installed at present, but provision is being made for the inclusion of a second unit, when increasing maturing plantations necessitate a greater mill capacity.

The second feature is the thoroughness of the methods of utilization. The timber, after leaving the gang saw, is edged, docked, sorted, and loaded in segregated lengths onto kiln trucks. It is then transferred to one of a battery of the latest type of internal fan-drying kilns, and after completely controlled drying is transferred once again to the planer. Here it is unloaded directly from the kiln truck to the machine, and is converted to floorings, linings, or weatherboards as desired. The machined boards are then conveyed to the dry storage sheds. Case stock is cut from the

mill waste and is handled independently through a separate seasoning kiln to the case sheds.

Naturally a plant of this type has been rather exacting in the class of mill building required, and it is here that *P. radiata* has shown its true worth. The roof trusses entirely of *P. radiata* have an unsupported span of over 60 feet. The long wall studs, the plates, the 2-inch flooring with its rebated joints, the heavy mill floor joists, and floor bearers are a definite proof that intelligent design is all that is necessary to secure satisfactory service from this timber. There can be no more fitting refutation of the idea that *P. radiata* is a timber suited only to the inferior uses.

Scandinavian Forest Fire Insurance Companies Form Union

The Scandinavian Forest Fire Insurance Companies Union was organized in August, 1930, when representatives of Norwegian, Swedish, Danish, and Finnish insurance companies met in the first Northern Forest Fire Congress, held in Oslo. The purposes of the union are to collect information on forest fire protection and insurance and issue it to the member companies and to formulate uniform compensation rules.

The Danish Plantation Insurance Co. has now insured more than 40,000 hectares of forest plantations in Denmark for 16,000,000 kroner. In Sweden several companies, including the largest general insurance companies, have insured approximately 8,000,000 hectares of forest property for about 800,000,000 kroner. Landowners in Sweden who have taken out forest insurance number between 70,000 and 75,000. In Norway the Norwegian Mutual Forest Fire Insurance Co., founded in 1912, has issued policies on 2,000,000 hectares with a valuation of 400,000,000 kroner, the policy holders numbering about 13,000. In Finland the Sampo Mutual Insurance Co., founded in 1914, and the Forest Owners' Mutual, founded in 1916, have issued policies to about 30,000 owners altogether. It is estimated that the forest areas insured have a total area of 2,000,000 hectares and a valuation of about 3,000,000,000 marks.



Canada produced 8,208,276 pounds of maple sugar and 2,185,379 gallons of maple sirup last year. In quoting these totals the Dominion Government rates 1930 as a good average year in regard to output of maple products. The sugar was valued at \$1,381,513 and the sirup at \$3,869,107. In 1929 the Dominion produced 11,698,925 pounds of maple sugar and its total output of sugar and sirup was valued at \$6,118,856.

Mistletoe Injury to Fir Trees in Switzerland

Writing in the *Journal Forestier Suisse*, J. Péter-Contesse records some striking instances of deformation and stunting of fir trees in Switzerland as a result of attack by mistletoe. The fir invariably reacts with a hypertrophy of its tissues at and near the point of attachment and development of the mistletoe. As a rule the hypertrophy is rather slight in the case of firs supporting mistletoe having highly developed aerial growth, and much greater in cases in which the parasite's development is limited to roots, "sucoirs," and adventitious buds. Firs supporting mistletoe frequently have a greater diameter at a height of 6, 8, or 10 meters than at the base. One case is known in which such a fir, 50 centimeters in diameter at the base and 41 centimeters in diameter at a height of 8 meters, at a height of 9 meters had a diameter of no less than 80 centimeters.

Frequently the attack by mistletoe reduces height growth to a few centimeters a year or entirely checks it. As a typical example of diameter growth gradually diminished through this cause M. Péter-Contesse describes an isolated fir that grew on fertile soil in environmental conditions entirely favorable for rapid development. The tree was 26 meters in height and had a well-developed crown. Growth of mistletoe on the trunk had been in progress more than 40 years when the tree was cut at the age of 106 years. Only one log of 9 meters at the base could be used for lumber; all the remainder of the trunk was a succession of swellings and constrictions. The diameter varied as follows: At breast height, 49 centimeters; at 12.5 meters, 64 centimeters; at 13.5 meters, 47 centimeters; and at 14.7 meters, 56 centimeters. Increment, which amounted to 6.7 per cent between the ages of 41 and 50 years, decreased until between the ages of 91 and 100 years it was but 0.53 per cent.

One reason for such reduction in rate of growth, explains M. Péter-Contesse, is the fact that the growth period of the parasite does not coincide with that of the host. The mistletoe begins to grow at the end of winter, in February, when the fir is still resting. To compensate the evaporation from its young shoots and flowers and to satisfy its food requirements the mistletoe probably robs the fir of a great part of the reserves, accumulated in the course of the preceding year, which the tree would normally use to sustain itself during the first few weeks of the vegetative period. When the fir begins to vegetate it finds itself "empty." A dry summer invariably results in the death of considerable numbers of the firs that are badly infected.

The missel thrush is identified as the agent of the spread of mistletoe in fir forests of Switzerland. Migrating from the south at the beginning of spring, the thrush arrives in that country at a time when food suitable for its use is scarce. The berries of the mistletoe

are available because they are rejected as food by all the indigenous birds. Consequently the thrush lives almost exclusively on these berries during its migration and during the first weeks of its sojourn in Switzerland.

Shelter-Belt Planting in the Prairie Provinces

More than 6,000,000 tree seedlings and cuttings were distributed by the Canadian Forest Service in 1930 from nursery stations at Indian Head and Sutherland, for shelter-belt planting on farms in the Prairie Provinces. Beginning in 1901, the service has distributed 116,000,000 trees for this purpose, to more than 100,000 applicants. Returns of forest inspectors indicate that 80 per cent of all the plantations set out on the Canadian prairies under this plan are now "flourishing and vigorous." The successful plantations cover 32,000 acres in all, or an average of nearly one-half acre each. Cuttings and seed from the plantations established with nursery stock are used to start plantings on neighboring farms. Of the 7,600 farms on which shelter-belt plantings were inspected during the past year 6,800 had well-kept gardens, 2,700 had plots of small fruits, and 400 had orchards containing fruit-bearing trees.

New Brunswick University Forest School Occupies New Building

The forest school of the University of New Brunswick, at Fredericton, established 23 years ago, is housed this year in a new forestry and geology building for the construction and equipping of which the provincial government some years ago authorized expenditure of \$300,000. In all 15,000 square feet of floor space has been made available for the use of the forest school, including a lecture room accommodating 200 persons, three laboratories each of which contains working space for 32 students, and a 24 by 61 foot drafting room. For the purchase of special equipment required by the school various forest industries in New Brunswick and Quebec have contributed \$15,000.

A tract of 3,640 acres of forest land almost adjoining the university campus has been under the care of the forest school since 1908. Through cooperation of the provincial department of lands and mines the school has the use of an experimental nursery and a modern seed-extracting plant.

To date, 96 men have been graduated from the school. The present enrollment is 47.

A gift of £25,000 was received during the past school year by the Imperial Forestry Institute, University of Oxford, as a contribution toward the institute's building fund, from the Rajah of Sarawak, H. H. Sir Charles Vyner Brooke, G. C. M. G.

Personals

William F. Pickett, assistant professor of horticulture in the Kansas State Agricultural College, has been named State forester of Kansas, succeeding the late Albert Dickens.

John W. Keller has become deputy secretary of the Pennsylvania Department of Forests and Waters. His former position of State highway forester has been accepted by Walter D. Ludwig, a graduate of the Pennsylvania State Forest School, who served for an extended period as district forester for the Gallitzin district, with headquarters at Johnstown, Pa.

Joseph S. Illick, recently State forester of Pennsylvania, is under temporary appointment as special lecturer in silviculture at the New York State College of Forestry, carrying on the work of the late John W. Stephen. Professor Illick is a graduate of the Biltmore Forest School and of Juniata College, and studied for one year in the University of Munich, Germany. Prior to 1919, when he took up administrative duties in the Pennsylvania Department of Forests and Waters, he had 10 years' teaching experience in the Pennsylvania State Forest School.

Burt P. Kirkland, since 1912 a member of the forestry faculty of the University of Washington, has resigned to accept appointment to the United States Forest Service as principal forest economist. He is appointed for work in the Pacific Northwest in connection with the national survey of forest resources and requirements. Mr. Kirkland was recently appointed to the editorial staff of the *Journal of Forestry*, taking the field of forest protection and administration, as successor to E. O. Siecke.

Axel Brandstrom has accepted appointment as senior forest economist in the United States Forest Service, leaving a position on the forestry faculty of the University of Washington which he has held since 1928. His new duties are in connection with the forest survey in the Pacific Northwest. He is succeeded by Russell Mills, a 1922 forestry graduate of the University of Washington who has been connected with the Sauk River Lumber Co. since 1924 as a logging engineer.

Charles S. Howard, president of the Howard Automobile Co. of San Francisco, and Ernest G. Dudley, of Exeter, Calif., formerly connected with the United States Forest Service, have been appointed members of the California State Board of Forestry.

Mrs. Edmund N. Brown, of San Francisco, has been appointed a member of the California State Park Commission. Mrs. Brown has been active in city and county park work.

P. A. Herbert, of the forest taxation inquiry of the United States Forest Service, is now a member of the editorial staff of the *Journal of Forestry*, in charge of the department of forest economics and policy. This place was recently resigned by Ward Shepard.

Stanley C. Clarke has been appointed extension forester for Idaho, effective March 1. He succeeds Otto C. F. Krueger, who after a brief period of service in that position has returned to the United States Forest Service. Mr. Clarke is a graduate of the University of Illinois and has had 15 years' experience as a chemist. Recently he has been studying forestry in the University of Idaho.

Calvin H. Kauffman, professor of botany in the University of Michigan and director of the university herbarium, will retire at the end of the present academic year with the title of professor emeritus of botany and director emeritus of the university herbarium. He will be succeeded by Edwin B. Mains.

Francis H. Eyre has been transferred from the division of silvics of the Washington, D. C., office of the United States Forest Service, with which he had been connected since the early part of 1927, to the Lake States Forest Experiment Station. He joins the experiment station with the full grade of silviculturist.

H. L. Person, since 1927 consulting forest entomologist with the California Forest Experiment Station, is now a member of the United States Forest Service. His new duties have to do with the California station's studies of forest management in the redwood region. Mr. Person received the bachelor's and master's degrees from the University of Minnesota in 1921 and 1922, respectively. His connection with the office of forest insect investigations, Bureau of Entomology, dated from the latter year.

Charles C. McCracken, president of the Connecticut Agricultural College, is chairman of a George Washington Bicentennial tree-planting committee appointed for Connecticut by State Forester Hawes.

W. R. Dunlap, a graduate of the Pennsylvania State Forest School, who for the past two years has been associated with the southern forestry educational project of the American Forestry Association, working in Mississippi and in Florida, is now a district forester of South Carolina, stationed at Walterboro.

H. Y. Forsyth is now a district forester in South Carolina, stationed at Aiken. Mr. Forsyth is a graduate of the Pennsylvania State Forest School and has had experience in State forestry work in Pennsylvania, West Virginia, and New Jersey.

James R. Simmons has resigned as secretary-treasurer of the New York State Forestry Association, after serving in that position for more than 10 years. John C. Sammi, instructor in the department of engineering of the New York State College of Forestry, has been appointed to succeed him temporarily.

Edward D. Freeland has been appointed superintendent of the Wind Cave National Park, S. Dak., by transfer from Carlsbad Caverns National Park, N. Mex., where he had been chief ranger since 1929.

C. Marshall Finnan is being advanced to the superintendency of Mesa Verde National Park, Colo., effective

March 16. Mr. Finnan has served for some time as chief ranger of the park and recently as acting superintendent.

James E. Gurr, supervisor of the Toiyabe National Forest, Nev., has been transferred to the Dixie National Forest, in the same State. He succeeds Orange A. Olsen, who was recently placed in charge of fish and game work in the Ogden, Utah, regional office of the United States Forest Service.

Walter U. Gartska, a 1930 graduate of the Yale School of Forestry, is now an instructor in the Pennsylvania State Forest School.

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New Book on Forest Resources of the World

By W. N. SPARHAWK, United States Forest Service

A great quantity of statistical and other information regarding the forests of various countries, particularly in Europe, has become available during the last 10 years. Two Finnish authors, Lauri Iivessalo and Matti Jalava, have brought much of this information together in a recent publication¹ which, fortunately for American readers, contains a summary in English. The general results and conclusions differ very little from those stated by Zon and Sparhawk in *Forest Resources of the World*, published in 1923, although the figures given by the Finnish authors for many individual countries are quite different from those appearing in the earlier work. The most important differences are in the figures for Russia. The new volume shows approximately 125,000,000 acres less forest in the Soviet Union, with 200,000,000 cubic meters less annual growth and 37,000,000 cubic meters smaller annual cut in European Russia. No estimate of growth and cut is made for Asiatic Russia. On the other hand, somewhat larger forest areas are given for Finland and Sweden, which have recently completed nationwide forest inventories, and the figure for total annual growth in each of these countries is increased by more than 25 per cent.

Among other conclusions the authors state:

Although the world's forest supply is still very plentiful, and by exhausting this supply the demand for wood can still for a long time be filled, it is observed that the use of the total forest reserve is almost impossible due to its inaccessibility and that the accessible forests are not inexhaustible. * * * The wood market has been overflowed lately, and this has given rise to the false opinion that the wood supply is abun-

dant. The overflowed wood market is not the result of an excessive forest supply, but rather the result of the poor economic conditions in many States which have made it necessary to use the reserved forests. * * * Humanity can evidently not get along without wood. If the world's future demand for wood is going to be filled, rational forest care and cultivation must replace the present wasteful use of the forests.

Forests of Finland

By W. N. SPARHAWK, United States Forest Service

The results of the general survey of the Finnish forests have been published in three volumes, in which the data were treated by provinces and by major watersheds. In order to localize the information still further, the Forest Research Institute has now published a volume² giving the details by minor subdivisions. As the distance between survey lines rendered it impractical to use small watersheds or political units the country has been subdivided into 78 units more or less homogeneous in fertility. For each unit are shown in tables and charts the percentages of good and poor forest, waste land, and cultivated land; productive forest by types; swamp forest by types; composition of the forests by species and age classes; average growing stock and actual and potential growth per hectare; and extent and ownership of cultivable land, by forest types. Considerable attention is paid to the matter of cultivable land because of its bearing on the future productive forest area. It was, of course, impractical to make an intensive land classification. In estimating the cultivable area, the principal index was the forest type (i. e., character of surface vegetation), with allowance for stones, topography, possibility of economical drainage, etc. Of the total uncultivated land in Finland 16.6 per cent is considered fit for cultivation.

¹ Maapallon Metsävarat. 407 pp. Reprinted from *Communications ex Instituto Quaestionum Forestalium Finlandiae Editae*. Helsinki, 1930.

² Iivessalo, Yrjö: *Suomen Metsät Viljavuusalueittain Kuvattuina*. (The Forests of Finland Described by Areas of Fertility.) Reprint from *Communications ex Instituto Quaestionum Forestalium Finlandiae Editae* 15. Helsinki, 1930.

The percentage of cultivable area is much higher for swamp land (32 per cent) than for uplands (7.7 per cent), probably because most of the usable upland is already occupied.

Wisconsin Presents Results of County Land-Use Surveys

By RONALD B. CRAIG, United States Forest Service

Any forester concerned with problems of land use and economies will do well to study a circular entitled "Making the Most of Marinette County Land" and circulars of parallel title dealing with Ashland and Taylor Counties, published by the Agricultural Extension Service of the University of Wisconsin. The three publications appeared in 1929, 1930, and 1931, respectively. Each is an excellent review of an analysis of county "assets and liabilities" made as a preliminary effort toward solving county land-utilization and revenue problems. The text of each is admirably supplemented with tables and charts showing land utilization, soil types, class of land ownership, location of agricultural and forest industries and public utilities, recreational development, tax delinquency, etc. While the statistical data presented will be of interest only to those concerned with conditions in the Lake States, the survey methods illustrated may well be adapted to studies of the best use of land in other regions.

Forest land makes up a large part of Marinette County; agricultural land and mineral land predominate in Ashland County; cut-over, waste, and swamp land compose 58 per cent of the area of Taylor County. All three counties derive a large portion of their present revenue from dairy and agricultural products. Tax delinquency is high in all three, especially in the towns farthest from railroads. The Marinette County report shows the need of reorganizing land utilization, chiefly through a shift from cultivation of submarginal agricultural land to development of forest land so that it will support local wood-using industries. In Ashland County, on the other hand, agriculture is progressing favorably and the major problems have to do with forest management and with mineral development. In Taylor County, with its large proportion of cut-over and waste land, the problem is chiefly a matter of Federal, State, or county purchase of lands physically or economically unsuited for agriculture and the creation of public forests from such lands. Tax-delinquent lands on which Taylor County has already taken title or will soon do so might well form the nuclei for a series of county forests. In all three reports the need of additional public forest domain is stressed, as well as the need of consolidating school districts and, on certain areas, consolidating farming units on fine agricultural soils.

Some errors are noted. On page 10 of the Marinette report the figures shown for milk production in 1920 and in 1925 indicate an increase of 34 per cent,

but the text states that the increase was 35 per cent. In both the Ashland County and Taylor County reports the circle graph showing farm income is faulty in that a sector greater than one-half is labeled simply "milk," with no indication of the fact, shown by figures given elsewhere on the page, that it represents income from sales not only of milk and cream but of butter, cheese, ice cream, and other dairy products. The Marinette report would have been improved by a graph showing the sources of gross farm income and by a map showing the location of the county with reference to other parts of the State. Both these features are included in the Ashland County report. The Ashland and Taylor County reports show in general the improvement in presentation of data that might be expected in later efforts.

Since these studies were preliminary in character, the suggestions made for improving conditions of land utilization and income are necessarily general rather than specific.

What Florida Offers the Pulp and Paper Manufacturer

By RONALD B. CRAIG, United States Forest Service

An interesting bulletin³ by Harry Lee Baker, State forester of Florida, and William L. Wilson is designed to present to manufacturers of pulp and paper throughout the United States the advantages which Florida possesses for this industry. The authors consider in detail the four factors which they regard as determining the development and expansion of paper manufacture in the State. These are (1) the kinds of pulp that can be manufactured from Florida wood, and the demand for such pulps; (2) the competition from other regions, on the basis of cost of production; (3) the availability of the materials and facilities essential for converting wood into pulp and paper; and (4) the availability of timber resources sufficient to keep pulp mills running for an indefinite period of time.

C. E. Curran, chemist of the United States Forest Products Laboratory, is quoted to show that southern pine, in addition to being suitable for manufacture into kraft paper, can by means of processes recently developed be used, either alone or in combination with gum and other hardwoods, to make newsprint, book paper, and bond. Figures are presented indicating that in the last decade domestic consumption of kraft pulp has increased at the rate of 233 per cent, whereas imports of kraft pulp have increased but 100 per cent.

In respect to both of "the principal cost factors for any prospective pulp mill enterprise to consider," cost of raw materials delivered at the mill and cost of transporting the finished product, the report shows that there is a decided differential in Florida's favor. "Pulpwood at the mill in Florida costs less than one-

³ Possibilities of Pulp and Paper Making in Florida. 36 pp. Florida Forest Service Bulletin No. 3. Tallahassee, Fla., 1930.

half the average for the United States. With transportation charges added, Florida producers of paper can lay down their product at New York much cheaper than can northern producers, the differential for kraft paper in favor of Florida kraft products being estimated in 1930 at \$6.56 a ton." The raw materials other than timber that are necessary for the manufacture of pulp and paper, namely, salt in various forms, sulphur, rosin, lime, and clay, are all readily available in Florida. Supplies of pure water are abundant. High-grade coal from Alabama and oil from Texas and Mexico can be delivered at Florida ports at low cost. Hydroelectric possibilities are of the highest order.

The depletion of coniferous timber in the North-eastern States and the fact that imports from foreign countries can not be counted upon with certainty to supply our pulpwood requirements are mentioned as favoring utilization of southern pines, notably slash and longleaf, for pulp. The authors quote a 1924 estimate of the United States Forest Service placing the volume of southern pine suitable for pulp at about 940,000,000 cords, more than four times the total stand of northern spruce, fir, and hemlock. According to Forest Service figures the pulpwood yield of longleaf pine and that of slash pine are about 11 and 22 times, respectively, as great as that of spruce in the Northeastern States at 30 years of age, and at 60 years exceed that of spruce by 15 and 24 cords, respectively, per acre.

A brief discussion of Florida's extremely favorable taxation system is included, stressing the point that under a State constitutional amendment effective from July 1, 1929, through 1948 any paper or pulp mill established in Florida on or after the former date will be exempt from taxation for 15 years after establishment.

The bulletin gives evidence of hasty preparation, and would have benefited by more careful proofreading.

Several of the authors' statements are open to question. While no one can question the great advantage of the southern pines over spruce in rate of growth, the bulletin is at fault in implying that spruce, fir, and hemlock are the only species on which northern pulp manufacturers can depend either now or in the future. As a matter of fact, the new processes which have made possible the production of a better grade of paper from southern pines and the utilization of southern hardwoods for pulp manufacture have also made possible the manufacture of pulp from northern hardwoods, notably aspen, red maple, and beech. It is stated (p. 32) that "in the heart of the spruce pulp region of Canada and over much of the New England States spruce does not adequately restock the land, and such reproduction as does come in has strong competition from overshadowing hardwood reproduction." While spruce reproduction is undeniably inadequate on certain areas, particularly after fire, such areas compose only a small portion of the spruce land of the Northeast.

As a rule spruce reproduction forms a dense pure stand of from 1,500 to 2,000 trees per acre, which, barring fire and insect damage, ultimately develops into a fine stand of pulpwod.

This presentation of Florida's advantages for the paper industry will be of interest to all foresters; there can be no question that the region's possibilities, if developed, will have a profound effect on forestry and the forest industry not only in the South but in the North as well. The authors are to be commended for their very convincing argument.

Alignment Chart Volume Tables

By F. X. SCHUMACHER, United States Forest Service

The construction of a volume table, which gives average or estimated tree volume for given dimensions, is based upon a correlation analysis of volume with diameter and height. Volume tables have often been constructed on the assumption that we know nothing of the laws of relationship of volume to dimension in regular geometric solids, such as the paraboloid or the cone. Now, tree form approaches the form of these solids. Therefore it is perfectly logical to compare volume of trees of given dimensions with volume of known solids of the same dimensions and, by focusing attention upon the difference between them, make the appropriate corrections to the volume of the solid in order to arrive at the volume of the tree.

The added work involved through such comparison might outweigh the advantages, as sometimes happens in the use of the usual form-factor method of constructing volume tables, were it not possible to set up the volumes of the solid in alignment chart form. The alignment chart renders interpolation and volume correction easy, as both are graphic.

A number of base alignment charts have been prepared by the office of forest measurements, United States Forest Service. There is available for free distribution a limited supply of charts as follows:

Unit used	Range in—		Volume included
	D. b. h. (inches)	Total height (feet)	
Cubic feet.....	60	200	Entire stem.
Do.....	60	200	To 4 inches top d. i. b.
Board feet (Scribner).....	30	120	To 8 inches top d. i. b.
Do.....	30	120	To 10 inches top d. i. b.

A publication describing the method of constructing volume tables by the use of these charts is projected by the Forest Service, and in the meanwhile copies of a manuscript describing it are being lent to responsible foresters. By the use of this method, the service claims, a more accurate table can be constructed with a given quantity of data in a shorter time or, conversely,

a table of given accuracy can be constructed with data from fewer trees.

This claim is quite valid. But faulty interpretation of it may lead to grave error. We can not substitute improvement of technique for adequacy of sample and still expect to arrive at the desired end result—a good volume table of more than local application. To illustrate: Suppose we construct a volume table from 100 trees of second-growth red gum taken from two or three contiguous acres. We may be sure that the aggregate tabular volume will agree with the basic tree volumes to a fraction of 1 per cent. But we have no assurance that the table will apply to a second-growth red-gum type 10 miles away.

Let us consider an analogy. Suppose some one needing a reliable estimate of a township of timber makes a 100 per cent cruise of 1 acre and multiplies the acre volume by the number of acres in the township. Would we agree that the township was properly cruised? Indeed we would not, even should we know that the acre cruise was absolutely correct. We should realize that the principle of sampling had been violated. The township ought to be sampled by cruising enough acres, well distributed, to arrive at a satisfactory sample error.

The same principle of adequate sampling is just as binding in the production of a volume table that is designed for more than simply local application.

The Case of the Second-Growth Southern Pine

By D. B. DEMERITT, Pennsylvania State College

Nearly a decade ago the Southern Pine Association furnished the National Research Council with funds to start a study of the growth of the commercially important Southern pines. Most of the field work of this study was done by the Southern Forest Experiment Station. The results appeared in 1929 as Miscellaneous Publication No. 50 of the United States Department of Agriculture. Too technical for the lay reader, this early publication has been followed with a circular⁴ by R. D. Forbes and Donald Bruce, entitled "Rate of Growth of Second-Growth Southern Pines in Full Stands," which is an excellent popular presentation of the case for timber growing in the southern pineries.

In the South at the present time 12,000,000 acres of old-growth forest remains, more than 70,000,000 acres of land is fully or partially stocked with second-growth timber, and 30,000,000 acres of forest land is cut over but not restocked. Annually about 1,300,000 acres of pine lands are being added to the last-mentioned class, with no seed trees and no hope of natural regrowth. About half the lands classified as restocked support stands of cordwood size or less. Each year about 15,000,000 trees of the second-growth stands are

damaged or killed by the combination of turpentine and woods burning that is being practiced in longleaf and slash pine stands in the Southeast.

The three primary uses for the cut-over pine lands of the South are farming, grazing, and timber growing. Small areas with special advantages such as good climatic conditions or good transportation facilities offer promising possibilities for farming. On the other hand, the Bureau of Soils believes that 23 per cent of the southerly part of the Coastal Plain is hopeless for agricultural development and that the soil on an additional 15 per cent is likely to prove for the most part very inferior for farming. In the Southern States the grazing industry, which formerly flourished there, has "fallen on evil days." Despite the mildness of the climate, losses of range livestock from exposure have been comparable to those in many other important stock-producing regions of the United States. Heavy losses have resulted also from disease and from the action of parasites. "It seems entirely possible to reorganize the stock industry of the South by such measures as prevention of fires, fencing of the range, production of winter feed, and introduction of scientific feeding and breeding methods." Even so, grazing and farming combined must be inadequate as a general solution of the problem of the cut-over pine lands.

The discussion of timber growing brings out the ease of natural reproduction of the southern pines and other favorable natural conditions, and then some of the obstacles, including fire, taxation, competition of virgin timber, and the average American's lack of acquaintance with facts regarding timber growing. As examples of timber-growing projects that have succeeded in spite of these obstacles, stories are told of how a Georgia farmer has for 20 years so handled a shortleaf pine woodland as to obtain a cut of sawlogs every 3 to 5 years and how a lumber and pulp company is managing 425,000 acres of land in Louisiana and Mississippi for sustained yield.

A point of interest is the fact that southern pine manufacturing industries employ 20 per cent of the industrial workers of the region and produce 9 per cent of the region's industrial products by value. These industries' investment in sawmills, logging railroads, equipment, and stumpage, exclusive of lands, amounts to approximately \$1,130,000,000, and the taxes they pay annually total nearly \$15,000,000.

Since 1909 the cut of southern pine lumber has been slowly declining. In part, however, this is a paper decline; the increase in number of small portable sawmills has made it difficult to obtain an accurate account of all the lumber cut. The output of portable mills in second-growth shortleaf stands is a matter of amazement to operators of large mills who have been "contemptuous of second growth."

The contempt with which users of southern pine have regarded second-growth timber has been based partly upon the fact that some second-growth saw logs have come from stands that were too open to produce

⁴ U. S. Department of Agriculture Circular 124. Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

clean stems. In many cases the logs have been poorly sawed and often the lumber has been imperfectly dried and has not been graded. Stain and other defects have given this lumber an unenviable reputation in many quarters. Logs from stands grown under good forest management, on the other hand, if carefully manufactured produce lumber of very serviceable grades.

The latter part of the bulletin is given over to the presentation of volume, yield, and stand tables, each accompanied by a full and detailed explanation of technical terms. The method of using the tables is explained with considerable care. For more detailed and more technical information regarding their construction the reader is referred to the earlier report on the same study.

Yield tables show yields in 5-year periods for heights from 60 to 120 feet by 10-foot site-index classes. The manner of applying these tables to a given stand is ably explained. After the quality of the site is once determined, the timber-producing power of the land can be gotten from these tables. When a decision has been made as to the product to be grown, growth calculations may be made for the most profitable rotation for full or partial stands. The yield tables serve also as a guide to good thinning practice and to partial determination of fire damage.

The study shows that the four chief southern pines "rank among the most rapidly growing commercial trees of the United States." Production of cordwood on a 20-year rotation in full stands on average sites shows the following yields: Slash pine, 36 cords per acre; loblolly pine, 28 cords per acre; shortleaf pine, 18 cords per acre; and longleaf pine, 15 cords per acre.

The publication of this circular makes available to the southern timber grower information of paramount importance. In the past the lack of exact knowledge of the growth rate and possible yields of southern pines has undoubtedly retarded the practice of even crude forestry by southern landowners.

Empire Forestry Handbook, 1930

The Empire Forestry Handbook, 1930, published by the Empire Forestry Association, contains lists of the forest officers in all parts of the British Empire, departments and institutions dealing with Empire forestry, higher forest schools, and forest research institutions. The program of work under way at each institution is outlined. A feature of interest to American wood users is a list of standard trade names and botanical names of more than 200 species of commercially important timbers produced in the Empire. This list was prepared by a committee of the association at the request of the British Empire Forestry Conference of 1928. It is intended that the list shall be revised from time to time and that the names shall be adopted as standard in all branches of the timber trade throughout the Empire.

Releasing and Weeding in New England

By E. E. CARTER, United States Forest Service

Enthusiastic support for the practice of girdling worthless hardwoods so as to release spruce and other conifers is given in a report of a special committee of the New England section of the Society of American Foresters. This committee reviewed the available data on the subject, concluded that the value of the practice as a business undertaking has been well demonstrated, and in their report fairly lash the foresters of the region for inactivity in "the most profitable field of silvicultural operations" especially in spruce-hardwood mixtures which are to be logged for pulpwood in about 10 years. The report summarizes the data on costs of weedings and release cuttings to favor conifers in young stands and strongly advocates such operations for New England conditions, especially on sites well suited for conifers.

The possible use of hardwoods for pulpwood is recognized, but "even under the most intensive utilization of hardwood there will always be a legitimate place for girdling" to stimulate the growth of spruce and other conifers.

Edward S. Bryant is chairman of the committee. The other members are Baldwin, Hawkins, Hosley, Toumey, and Westveld.

The Forest Service: Its History, Activities, and Organization

By HERBERT A. SMITH, United States Forest Service

The Institute for Government Research, a division of the Brookings Institution of Washington, D. C., seeks "to aid constructively in the development of sound national policies." Its lengthening list of publications includes a series of "service monographs of the United States Government." The common foreword of the monographs sets forth that no undertaking in this country, and few if any in the world, approach in magnitude, complexity, and importance that of the United States Government; that this vast organization has never been studied in detail as an administrative mechanism; and that to lay the basis for such a study the Institute for Government Research has undertaken a detailed description of each of the distinct services of the Government. A 268-page volume on the Forest Service has taken its place as number 58 in this series.

The body of the text of this monograph consists of three chapters, headed "history," "activities," and "organization." These three chapters occupy 122 pages, as against 146 pages occupied by six appendixes and an index.

The initial chapter, "History," exceeds the others both in bulk and in significance. It is a marvel of condensation and accuracy. The chapter is in effect not only a history of the establishment and develop-

ment of the Forest Service but a history of the forest policy and activities of the Federal Government from the beginning. It is the product of detailed independent research, not a compilation or rewrite of information derived from secondary sources; and for authoritativeness combined with brevity it has no rival in earlier work dealing with the subject.

The narrative does not profess to cover the general forestry movement in the United States, as such. It confines itself pretty strictly to events recorded in official documents, without attempting to seek out causes or deal with the forces that gave the movement dynamic quality. The effort for forest conservation in the United States has been made dramatic by personalities, contending interests, clashes of sectional ways of thought, changing public opinion. Of such things this history gives little hint. The informed reader will be reminded of much that is not mentioned; but he will find nothing that misleads, nothing that is inexact, and little indeed that could well have been left out.

The chapters on "Activities" and "Organization" are less clear-cut. The former crowds 30 pages with specifications regarding the great variety of things that the Forest Service does, but it is more of a catalogue than a coherent, well-balanced account of organic functioning—and, at that, a catalogue with many gaps. Similarly, the chapter on "Organization" indicates how the Forest Service units and subunits are related and officered and what character of duties each performs, but it does not treat the service as a working mechanism contrived with a view to the efficient discharge of specific difficult tasks. The chapter supplements and to some extent clarifies what was brought out under activities, while to some extent also virtually duplicating it.

The first appendix, "Outline of organization," tabulates the positions and corresponding salaries in the several units and subunits of the organization as of November, 1929. In the nature of the case such a tabulation soon becomes out of date. Appendix 3 gives a short account of the various kinds of publications that have been issued by the Forest Service, with illustrative titles. Appendix 4, "Laws," reproduces the text of many of the acts of Congress relating to the Forest Service and its work, from 1876 to 1930. In spite of some omissions it will be useful for reference purposes. Appendix 5 covers Forest Service appropriations from 1891 to 1930, expenditures for the fiscal years 1927-1930, and national forest receipts from 1905 to 1929, inclusive. The final appendix is a miscellaneous list, nearly 50 pages long, of books, pamphlets, and periodical articles, of widely varying significance, relating to the service and its work. A typographical error causes the title of Ise's important book on the United States forest policy to appear under the disguise of "United States forest police."

The monograph was not planned to make lively reading; and limitations of field and method have prevented it from having the value it might have had as a contribution to the study of the Federal establishment. Nevertheless, as a reference book it will find wide usefulness. Students of governmental conservation activities will give it hearty welcome. For the general reader wishing to inform himself on what the Forest Service field of work is and how it is covered, the monograph provides a carefully prepared, condensed, and, on the whole, authoritative account that fills a place never before occupied.

Up-to-Date Directions for Preventing Termite Damage

By V. L. HARPER, United States Forest Service

To many of us, old buildings under which the wooden foundations have crumpled are a familiar sight. On first thought one is inclined to blame fungi for the rotlike damage; frequently, however, a little digging around the foundation discloses numerous antlike insects making their home in the débris, and it is not hard to establish the fact that these insects have been intimately connected with the crime. In *Farmers' Bulletin No. 1472, Preventing Damage by Termites or White Ants*, T. E. Snyder describes the identifying characteristics of these wood-destroying insects and their habits—particularly their bad habit of eating everything from revenue stamps and old shoes to the walls and foundations of houses—and gives the latest information as to methods of preventing termite damage. This publication first appeared in 1926, superseding *Farmers' Bulletin No. 1037, White Ants as Pests in the United States and Methods of Preventing their Damage*. It has been issued in revised form⁵ under the date June, 1930.

No less than 44 species of destructive native termites are distributed through the United States. Two types of termite are recognized: The subterranean, which requires direct access to moisture and hence works only in materials that are in contact with the ground, and the nonsubterranean, which is capable of working in furniture, woodwork, etc., without direct access to moisture. The second type is found in the warmer regions only of the United States, which partly accounts for the fact that by far the greatest damage from termites in this country occurs in the South and in the Pacific coast region.

The only way to give untreated woodwork effective and permanent protection from attack by subterranean termites, says Doctor Snyder, is to insulate it completely from the ground. It is recommended that foundations of buildings, including basement pillars,

⁵ Copies may be obtained free of charge, as long as the supply lasts, from the Office of Information, U. S. Department of Agriculture, Washington, D. C.

be constructed of stone, brick, concrete, or concrete and metal. If the use of these materials is impracticable, the substitute should be timber impregnated with coal-tar creosote. In regions where nonsubterranean termites are common it is suggested that interior woodwork, furniture, etc., be impregnated with zinc chloride, bichloride of mercury, sodium fluoride, or some other effective preservative. In case of slight and localized damage by nonsubterranean termites the damaged wood should be removed and replaced. Where wood has been seriously damaged but not structurally weakened the infested wood should be saturated with orthodichlorobenzene.

In preparing the 1930 edition of the bulletin Doctor Snyder eliminated the recommendation of hydrocyanic-acid gas as a means of destroying nonsubterranean termites. Also, in cases in which it is not practicable to apply orthodichlorobenzene to wood infested with this type of termites he now recommends that holes be bored in the wood with an auger and dry Paris green blown into them. (In using this poison great care should of course be taken to avoid breathing or swallowing any of it.) The distribution map in the revised edition shows the northern limit of damage by subterranean termites as well as that of damage by the dry-wood variety.

An illustrated bulletin on Termites and Termite Damage was issued in 1930 as Circular 318 of the California Agricultural Experiment Station. In California a termite investigations committee formed by various industries and the University of California, and including representatives of the Federal Department of Agriculture, has been at work for more than two years.

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