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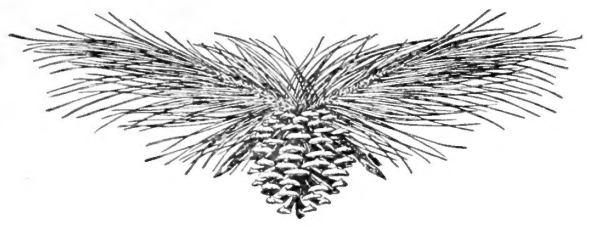
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FOREST WORKER



July, 1929

Published bimonthly by the FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

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

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

FOREST WORKER

Washington, D. C.

JULY, 1929

Vol. 5, No. 4

State Forestry

Tennessee Extends Its Program of Forest Planting on Farms

By R. S. MADDOX, State Forester of Tennessee

In western Tennessee, trees from the State forest nursery were planted this spring on private holdings in every county but one. Seedlings distributed by the State to farmers in that section numbered a little more than 200,000. This is a beginning that we hope will in a few years run into millions. Only a nominal charge was made, and the State division of forestry sent out men to assist in preparing the ground and setting the seedlings. These men will later visit the farmers and instruct them in methods of cultivating the seedlings the first year.

It was only in the spring of 1928 that the Tennessee Division of Forestry began to grow forest tree seedlings on State-owned land. At that time we established a forest nursery on a 38-acre tract near Jackson, in Madison County. Madison County had thought well enough of our project for forest tree planting on farms to purchase this land and deed it to the State for nursery work and experimental planting.

Thus far the reforestation work conducted on Tennessee farms under the auspices of the State division of forestry has been confined almost wholly to reclamation plantings on eroded areas. The division has gone on the basis that on the gullied lands brush dams are necessary in all cases. Therefore our work of reclamation by tree planting has begun with the building of brush dams, followed by plowing off the gullied banks and then the intervening spaces. Planting is done in the spring following this treatment. Hereafter, we shall extend our reforestation work to other classes of farm land.

In our reclamation plantings the favorite species is black locust. The division encourages the planting, also, of yellow poplar, black walnut, red oak, white oak, and several conifers. This year we have sown in our nursery seed of a number of coniferous species for experimental work, among which are northern white pine, Norway pine, red spruce, western yellow pine,

Chinese fir, and Chinese cedar. The results from the setting of a very tiny area in Norway pine last year encourage us to look with a good deal of hope to this tree as a species valuable for reforestation.

In this spring's sowing in our nursery we used about 375 pounds of tree seed, mostly locust. From this we expect a production of from 500,000 to 1,000,000 seedlings. A Skinner sprinkling system assures rain when the seedlings need it. While these young trees are developing for next spring's planting, the field men of the division are engaging the interest of farmers in setting seedlings next spring.

One of the main purposes in the planting we are doing is to stimulate the interest of landowners in farm reforestation in general, by making them see that idle or waste land such as is now depressing the value of many Tennessee farms may be made a source of income. In this endeavor we now have the advantage of being able to point to a number of instances in which plantings not only have checked erosion but have quickly resulted in valuable stands of timber large enough for posts or approaching post size. A landowner in Henry County, in west Tennessee, who with the cooperation of the State division of forestry planted locusts in 1915 on land considered totally waste, reports that he is now selling posts from the planted area at the rate of \$400 per acre. A badly gullied area in Williamson County, in middle Tennessee, planted with locusts through State cooperation in 1916, now has on it locust post material worth \$145 per acre.



Under authority of the new Hewitt law, which provides for the establishment of productive State forests in New York, Conservation Commissioner Alexander Macdonald has approved contracts and options for 2,800 acres of land in the counties of Cortland, Chenango, and Otsego. The first area acquired under the law cost \$3.45 per acre; some of the others have cost only \$3 per acre. In general, the lands consist of abandoned farms lying on ridge tops at elevations ranging from 1,800 to 2,000 feet.

Florida Forestry Appropriation Greatly Increased

In the biennium beginning July 1, 1929, the Florida Forest Service will have nearly \$5 of State money to spend for every \$1 that was available in the preceding two years. Its former annual allowance of \$12,500 has been increased by the legislature to \$60,320. Funds allotted by the Federal Forest Service and by private property owners are expected to swell the board's annual budget to \$150,000. The increase in funds will make it possible to expand the protected area by more than 1,000,000 acres, providing for at least 10 protective units in addition to the 7 now in existence.

Measures Proposed by Minnesota Reforestation Commission Stand and Fall

By CROSBY A. HOAR, United States Forest Service

The Minnesota Legislature accepted only in part the series of forestry and conservation measures proposed at its recent session on recommendation of its interim reforestation commission. One of the conclusions which this commission reported, after a 2-year study in the course of which it conducted investigations and hearings not only in Minnesota but in several other States, was that the present functions of the commissioner of forestry and fire prevention, the commissioner of game and fish, and the commissioner of drainage and waters, and those of the State auditor relating to lands, timber, waters, and minerals, should be vested in a commissioner of conservation to be appointed by the governor. (At present the State auditor has absolute control of sales of timber on State land not reserved as State forest, and the State commissioner of forestry assists in the sale of State timber only as the auditor may request help.) Opposition was voiced to the inclusion in the proposed conservation department of the game and fish work and likewise to the inclusion of the mineral branch, which handles very valuable deposits of iron ore on State land. There was strong objection, also, to the organization of such a powerful department under a single director. These objections resulted in so many amendments to the measure that its essential purpose was destroyed, and the bill was withdrawn.

A bill proposing that the State pay an annual tax of 5 cents an acre on State forests to the counties in which the forests are situated was passed by the legislature but was vetoed by Governor Christianson. A similar bill had been passed and vetoed in 1927. A bill providing that the cost of managing State forests should be drawn from 50 per cent of the receipts from State timber sales was lost, as was one providing for a State nursery that would furnish stock to State forests and to State auxiliary forests.

Although these important forestry and conservation measures were lost, several acts were approved that have an important bearing upon the future of forestry in the State. One of these amended the auxiliary forest law, reducing the minimum annual land tax on auxiliary forests from 8 cents per \$100 valuation to 5 cents per acre. The amended law retains the additional tax of 3 cents per acre to be expended by the State in protecting the auxiliary forests from fire and the 10 per cent yield tax upon forest products cut from the auxiliary forests. An appropriation of \$40,000 was provided for a land survey of northeastern Minnesota to be made by the State commissioner of forestry and the agricultural department of the State university.

Provision was made for the purchase of State trust lands by the conservation department and for the exchange of lands so purchased for Government-owned land within the boundaries of national forests. Minnesota law provides that State trust lands can not be sold for less than \$5 per acre, and in exchanges between the State and the Federal Government these lands would probably not be appraised so high as that. Hence, to clear the way for exchanging State trust lands for Federal lands at whatever valuation may be agreed upon it is necessary that the State appropriate money to free the land from its obligation to the trust fund. An appropriation of \$10,000 was provided for this purpose, in order to make a small exchange that will develop the necessary experience to guide future exchanges on a larger scale. The legislature made provision whereby a constitutional amendment will be voted on at the next general State election authorizing the exchange of any of the public lands of the State, including lands held in trust for any purpose, for lands of the United States.

Control of white pine blister rust was provided for in an act that authorizes the commissioner of forestry to designate blister rust control areas and requires landowners in such areas to carry out such control measures as the commissioner may order, including the destruction of white pines and of currant and gooseberry plants. If an owner fails to comply with the commissioner's order for the destruction of plants the commissioner is to have the plants destroyed, the expense becoming a lien upon the owner's land collectible in the same manner as taxes. When control measures involve the destruction of white pines, or of cultivated currants or gooseberries, that are not infected with the rust, damages may be paid to the owner. The State inspector of nurseries is empowered to prohibit or regulate the shipment of white pines or Ribes into blister rust control areas within the State.

A very important act was approved that affords an example of State relief to counties overburdened with tax-delinquent lands. Several years ago extensive peat bogs in Beltrami, Koochiching, and Lake of the Woods Counties were drained by means of an extensive system of ditches. The counties issued

bonds to pay for the drainage, expecting to redeem them by means of ditch taxes assessed against prospective settlers upon the drained lands. Experience has shown that most of the drainage was unwise and that settlers can not farm the drained lands at a profit. Consequently a large area has become tax delinquent and the counties have approached the point at which the bonds must go by default. It was considered that the defaulting of bonds would not only bankrupt the three counties directly involved but endanger the credit of other counties and of the State. Consequently the legislature took action whereby the State assumes the debt represented by drainage bonds so far as delinquent lands are concerned. To reimburse itself as far as possible the State will establish on the drained areas a great game preserve in which game, fish, and forests will be fostered and handled for revenue.

California Strengthens its Fire Laws

A new law of California authorizes the State board of forestry, upon written petition of the owners of 50 per cent of the forest land in any particular region or zone, to designate the region or zone a hazardous fire area and prohibit smoking and the building of camp fires on it elsewhere than at points designated by the board. Another new California provision makes it a misdemeanor to light or use a camp fire on another's land without first obtaining a written permit from the owner or his agent. The penalty is a fine of not more than \$500 or imprisonment for not more than six months, or both. On property adjacent to territory under the jurisdiction of the United States Forest Service the requirement of a permit from the owner does not apply to anyone who has a written camp-fire permit issued by the service for use on such territory and who is complying with all rules and regulations of the service.

The "ash receiver" bill introduced in the recent session of the California Legislature was passed by both houses, but was not signed by the governor. The requirement proposed by this bill was the following:

Every motor vehicle operated upon a public highway shall be equipped with a suitable container or receptacle for the disposition or reception of burnt matches, pipe ashes or coals, cigarette butts, and cigar butts. Said container or receptacle shall be so constructed as to prevent the accidental escape therefrom of any matches, ashes, coals, or butts placed therein.

Under Idaho law it is now a misdemeanor to throw lighted smoking material from a vehicle, or otherwise deposit anything that may cause a fire, in any place where it may directly or indirectly cause a fire resulting in damage to forage on publicly or privately owned lands.

California's Fire Control Budget

California has \$208,685 of State funds budgeted for fire control in the fiscal year 1930, or 64 per cent more than in the preceding year. The new budget provides for additional man power in the more hazardous areas, several new lookout structures, and four fire trucks to be stationed at strategic points in the State. Since the general State emergency fund may be drawn upon in suppression emergencies, only a small proportion of the funds appropriated to the State forestry organization is budgeted for suppression. County cooperative funds also show a marked increase over those of the preceding year.

Southern California Association of Foresters and Fire Wardens

Southern California contains a large number of publicly employed foresters of three kinds—Federal, State, and county. In the belief that union will give them added strength for coping with the peculiarly difficult forest fire problems of the region, these men have organized as the Southern California Association of Foresters and Fire Wardens. The new organization will work toward standardization of fire-protection equipment and toward more effective handling of publicity and of educational programs. It hopes, also, to assist in bringing about greater uniformity of county fire laws. Complaint is made that the present variation among fire laws of different counties confuses the public and tends to cause misunderstanding of the value of such laws.

The area covered by the association's membership includes the counties of San Luis Obispo, Santa Barbara, Ventura, Kern, San Bernardino, Los Angeles, Orange, Riverside, and San Diego.

Frank E. Dunne, of Santa Barbara County, and Spence D. Turner, of Los Angeles County, the two county foresters through whose efforts the organization was formed, are serving as its president and publicity chairman, respectively.

In the Southeastern Forest Protective Area of Mississippi, the number of landowners cooperating with the State forestry commission in fire protection nearly trebled in the year ending June 30, 1929. Two new lookout towers were built on the area during the year, and the telephone mileage was increased from 60 to 187. The average area burned over per fire, which in the fiscal year 1928 had been 252 acres, in 1929 was 126 acres. At a meeting held June 8, 1929, all the co-operators present, representing 85 per cent of the land listed for protection, signified their intention to renew their contracts with the forestry commission for the coming fiscal year.

Massachusetts Firewardens Get Together in County Associations

A spirit of cooperation is being developed among Massachusetts firewardens through county associations organized by the State conservation department. In Massachusetts the responsibility for protecting forests from fire rests primarily on local firewardens appointed by selectmen or mayors, one to each town. As evidence that the county associations of firewardens, which meet once a month, are correcting the isolationist tendency of this system Chief Forester H. O. Cook cites the recent publication of a forest fire fighting manual through collaboration of the associations in Barnstable, Plymouth, Norfolk, and Bristol Counties. The manual contains the forest fire laws, lists of all the wardens in the several counties and of the fire equipment owned by each town, a summary of typical court cases that have been prosecuted in these counties, and suggestions as to fire fighting methods.

Fire Truck to Attend on Land Clearing Fires in Minnesota

A new fire-protection service now provided in Minnesota by the commissioner of forestry is a fire truck to be used where farmers are clearing land by means of fire. The truck carries 200 gallons of water in galvanized-iron tanks. This water is available for use in 5-gallon hand pumps, or it can be discharged by means of a thresher pump that is always serviceable in refilling the tanks. A power pump is carried for emergencies. An experienced fire fighter has charge of the truck. Arrangements for its use are made through cooperation with county agents, who know which farmers need help in clearing land.

Illinois Saves Remnant of its Northern White Pine Forests

In establishing the White Pine Grove, a State park opened to the public in 1928, Illinois has given protection to a stand of northern white pine that is almost the only one remaining in the State. The grove is situated in Ogle County, about 7 miles from Polo. The Chicago and Iowa Trail bounds it on the south, and a little to the north of it is the main line of the Burlington Railroad from Chicago to St. Paul. Purchase by the State of this area of 283 acres, late in 1927, was the outcome of 30 years' agitation.

The 193-acre tract occupied by northern white pine lies at an elevation of 950 feet. Its soil is a rather deep sandy loam and is fairly well supplied with water. The trees are about 80 years old. Some of them have attained a height of 90 feet and a diameter of 27 inches. State Forester Miller expects that the cessation of

grazing will result in the spreading of the pine to neighboring areas. His management plan includes setting pine transplants in openings, releasing young pines by removing overtopping hardwoods, and removing Ribes for protection from white pine blister rust.

A picturesque feature of the park is Pine Creek, which winds through it in a deep bed of rocks.

Maine Buys Forest Protection Equip- ment

The State of Maine this spring purchased 384 D. B. Smith fire pumps for use in suppressing forest fires. With this addition there are about 1,000 of these pumps in use in the State. Each of the pumps is equipped with a 5-gallon can. In addition the State has purchased eight 4-cylinder power pumps throwing 50 gallons of water a minute. Altogether there are 45 power pumps in use in the State, with 1,426 miles of telephone line, 77 lookout towers, and tools to equip 9,872 men. State Forester Violette is using copper weld wire for some of his telephone work, and finds it satisfactory in service. The light weight of this wire, only 96 pounds to the mile as against 175 pounds for the galvanized wire usually employed, is a special advantage when the wire must be packed through rough country.

Michigan Adds 26,500 Acres to Pigeon River Forest

The Pigeon River State Forest of Michigan was more than doubled in area in May of this year through State purchase of 26,500 acres of forest lands in Cheboygan and Otsego Counties. The newly acquired area is stocked with good second-growth timber and contains excellent game cover. The purchase brings within the State forest boundaries 20 miles of Pigeon River frontage, 5 miles of Black River frontage, several small lakes, and a number of trout streams.

A New State Forest for Massachusetts

An appropriation of \$20,000 has been provided by the Massachusetts Legislature for the purchase of about 1,000 acres of land in the towns of Ashby and Townsend, which will be known as the Willard Brook State Forest. The land lies on both sides of State highway No. 109, which leads from Boston to Peterboro, N. H., via Rindge. Near the Ashby-Townsend line the highway follows for about 3 miles the cascading mountain stream called Willard Brook, with the birch, hemlock, and laurel covered hillsides pressing close on either side. The prospective State forest is about 55 miles from Boston, only 7 miles from the city of Fitchburg, and close to other important centers in Worcester County. It is popular as a recreation ground.

Tax Exemption for Immature Tree Growth in Connecticut

A new law providing that immature tree growth may be exempted from taxation has been enacted in Connecticut. The owner of land bearing such growth who wishes to have it brought within the provisions of this law may apply for an examination of the area by the State forester. If after examining the area the State forester certifies that in his opinion it will be advantageous to the community and to the owner to permit the tree growth to remain standing until suitable to be cut for lumber, the assessed valuation of the area, including that of the tree growth, will remain stationary until the next general revaluation of real estate in the town in which the area is situated. After such revaluation the tree growth will be exempt from taxation until mature. (Connecticut law requires general revaluation of taxable property at intervals not longer than 10 years.)

The law specifically permits any farmer owning certified land to cut from it such wood or timber as he may need for farm use. No other provision is made in regard to cutting.

Any certificate issued by the State forester under this law may be revoked by him if he ascertains that the land to which it applies is no longer being used for the purposes contemplated in the act.

A law already in force in Connecticut provides for classification of lands for timber growing and for collection of a yield tax on forest products cut from lands so classified.

Maine's Auxiliary Forest Law

Maine has made provision for the establishment of auxiliary State forests on privately owned lands capable of producing the equivalent of 15,000 board feet of softwood or 8,000 board feet of hardwood per acre. Forested lands, including forest plantations, are eligible if it is the owner's intention to use them for the purpose of producing fuel or of producing timber for manufacture or sale. An owner's request that his land be included in the State's auxiliary forests is to be directed to the local assessors and the forest commissioner. If a request covering lands to be used primarily for the production of timber for manufacture or sale is not granted by the assessors, appeal may be made to the forest commissioner.

For the purpose of taxing auxiliary State forests assessors will appraise only the land and will appraise it at the same valuation as stripped forest land in the same vicinity, up to a maximum of \$2 per acre. When trees are cut from such forests for market or manufacture a yield tax will become due at rates graduated according to the year in which the trees are cut, as follows: First year, one-half of 1 per cent of the stumpage value; second year, 2 per cent; third year,

3 per cent; fourth year, 4 per cent; fifth year and thereafter, 5 per cent.

No yield tax will be due on timber cut for farm use by the owner or on timber cut to clear land for agriculture or for highway construction or similar purposes unless the wood is to be sold for fuel or used for manufacture.

The making of false returns under this law, refusal to make the returns within the specified period, or the cutting of trees from the auxiliary State forests contrary to the provisions of this act is punishable by a fine not exceeding \$1,000.

Not more than 10 per cent of the area of a town can be admitted as a part of the auxiliary State forests in any one year if a protest is made to the forest commissioner by the assessors.

Land included in the auxiliary State forests may be withdrawn on application by the owner and payment of the tax on the full value of the trees thereon.

Mississippi Farmer's Planted Black Locusts Profitable

Black locust trees grown from sprouts transplanted in 1918 by D. C. Lawhon, a farmer of Verona, Lee County, Miss., are now 6 to 9 inches in diameter and 40 to 50 feet tall, Assistant State Forester H. C. Mitchell reports, or so large that they will each make from 10 to 15 fence posts worth 15 cents apiece. The sprouts, which Mr. Mitchell says must have been 2 years old when transplanted, originated from the stump of a little black locust in the garden of the Lawhon home. Eighty sprouts were transplanted to a thicket of scrub trees and bushes on a steep hillside bordering a creek. The planting site presented ideal conditions, with good water supply, good drainage, and a soil of deep, rich loam. No further attention was given to the transplanted sprouts except protection from fire. This spring Mr. Lawhon refused an offer of \$1 each for the trees for use as telephone poles. Among the young trees now coming up from the seed of those transplanted, one 3 years old measures 2½ inches in diameter and is 15 feet tall.



Crude white arsenic has proved effective as a protection against white grubs in seed beds at the Vermont State forest nursery at Essex Junction, State Forester R. M. Ross reports. Formerly the grubs did great damage to seedlings in this nursery. Mr. Ross began the use of arsenic three years ago, on the advice of H. B. Peirson, State entomologist of Maine, and has continued it ever since. He uses 80 pounds of arsenic to the acre. The arsenic is mixed with enough sand to carry it and the mixture broadcast on the beds. Being a powerful poison, it must be handled with care.

In this year's spring planting the Michigan Department of Conservation surpassed its previous record by 40 per cent. More than 5,000,000 trees were planted, on 8,500 acres of State forest land.



New Jersey increased its distribution of forest planting stock by about half this spring, the increase being made possible by the availability of the first crop of seedlings from the State nursery at Washington Crossing. The total distribution of about 1,500,000 seedlings reached 500 planters. More than 1,000,000 of the seedlings were distributed to farmers and small landowners in lots of from 1,000 to 5,000.



The Eureka Lumber Co., of Washington, N. C., planted pines on 20 acres of cut-over land this spring in cooperation with the North Carolina Forestry Division, which reports this as the first forest planting of any considerable size on holdings of a large lumber company in the eastern part of the State. The 21,000 seedlings used were mostly of loblolly pine, with some slash and longleaf. Assistant Forester F. H. Claridge supervised the planting.



The 210 pounds of longleaf pine seed collected last November by the Texas Forest Service for sowing in the State nurseries cost about 56 cents a pound. The burrs were collected in Newton County from trees felled in logging and were hauled to the State forest by truck. There they were stored under cover and stirred at intervals until fully opened, when they were pitched about with a hayfork to shake out the seed. After being cleaned, the seed were stored in cans.

Studebaker Cooperates with Indiana Division of Forestry

The Studebaker Corporation has given the Indiana Division of Forestry the use of about half of its 800-acre proving ground at South Bend, Ind., for forest planting experiments. This affords the division an opportunity to experiment in forest planting on soil characteristic of the rolling glacial deposit of the northern part of the State. The soil is a well-drained gravel loam. In the plantings State Forester Wilcox intends to use conifers, including northern white, Norway, Scotch, jack, shortleaf, Corsican, and Virginia pine, Norway and white spruce, and European and Japanese larches, and also to use some hardwoods. Various species will be alternated on both the high and the low ground in order to find which ones are better adapted for different elevations in the region. A variety of spacing will be tried, from 4 feet by 4 feet to 8 feet by 8 feet. Planting was begun last fall, with the purpose of getting information on the results of fall as compared with spring planting.

The native woodland on the proving ground has been classified and is being managed according to the advice of the forestry division.



Correction: An estimate given in Cornell University's farm economics bulletin for December, 1928, as to the rate at which farm land has been abandoned in New York State, was incorrectly quoted in the article entitled "Two New York Forestry Laws Approved Unanimously," by Paul D. Kelleter, that appeared in the Forest Worker of May, 1929. The Cornell economists estimated that up to 1910 1,750,387 acres of land in New York was abandoned for farming, that in the period 1910-1920 the rate of abandonment was about 140,000 acres a year, and that in the period 1920-1925 it was about 270,000 acres a year.

Education and Extension

Summer Camp on National Forest for New Hampshire Forestry Students

The forestry department of the University of New Hampshire has been given a free use permit for a permanent summer camp on the White Mountain National Forest, N. H. The camp is located at Passaconaway, N. H., in the Swift River Valley, one of the most beautiful in the White Mountains. It is in the heart of the Swift River working circle and within easy reach of the Bartlett fuelwood area now being used by the Northeastern Forest Experiment Station; thus the

students will be in touch with United States Forest Service activities both in forest management and in silvicultural research. An opportunity for practical study of road construction is provided by work on the road from Passaconaway to Bartlett, which will be going on for the next three or four years. A residence that was on the land when it was acquired by the Government will be used as camp headquarters. While in camp the students will be organized as a unit in the fire-control system of the forest. This summer 6 students will be in camp, and in the future at least 20 are expected each year. The camp period will last for from six to eight weeks.

Big Four Forest Tree Flier Visits Communities in Southern Indiana

To stimulate interest in reforestation along its southern Indiana lines, the New York Central Railroad ran a forest tree flier over the Big Four route from Evansville to Greencastle in the week beginning March 24. The planner and manager of the tour was R. J. Plaster, agricultural agent for the road; the forestry staff included R. F. Wilcox, State forester, and C. C. Deam, research forester, Indiana; E. M. Bruner, district forest inspector, United States Forest Service; and Daniel Den Uyl, extension forester, Purdue University.

An exhibit car was prepared by taking the seats out of a coach, walling one side with beaver board, and constructing a platform bed 30 feet long and 4 feet wide in which was placed about 8 inches of soil. The beaver board was painted, and on it were arranged posters and other educational material. In a portion of the bed was displayed a model of the State forest nursery showing packing house, trees of different ages, and irrigation lines; other sections were occupied by exhibits of forest plantations, prepared with growing trees, indicating which species should be planted to produce posts, lumber, or Christmas trees. The car contained also an exhibit of forest fire protection equipment, displays of wood and lumber and of wood finishes, and an Indiana forestry fact exhibit. Near the exit was a booth from which were distributed forestry bulletins of the Government and of the State and booklets published by the American Tree Association.

A refrigerator car was packed with 230,000 forest tree seedlings from the Henryville nursery, mainly pine and spruce. A third car was used for lectures and conferences, and a fourth housed the staff.

The train's itinerary included 11 towns. The practice was to make a half-day stop at each town, opening the train for inspection and tree distribution from 8 to 12 for the morning stops and from 1 to 5.30 for the afternoon stops. The lecture car was used for conferences and for talks to small groups such as Boy Scouts and high school botany classes. Visitors to the train numbered 4,501. Requests for talks elsewhere than on the train were complied with whenever possible, and in this way 4,153 persons were reached. Talks were illustrated with moving pictures and slides whenever possible. Demonstrations of planting methods were given by the forestry staff to the many persons who shared in the distribution of the train's load of planting stock.

About two weeks before the tour began a poster showing the itinerary and illustrated with a cartoon by Charles Kuhn, of the Indianapolis News, was circulated throughout the district to be covered. Radio station WGBF, Evansville, broadcast the news of the tour, explaining its purpose and giving the complete itinerary. Newspaper articles were sent by Frank Parish, public-

ity director for the Indiana Department of Conservation, and C. A. Radford, publicity manager of the Big Four route, to every newspaper in the State, and the tour received very satisfactory treatment both from newspapers and from farm journals.

Conference on Woodcraft and Forestry Teaching in Summer Camps

The Society for Protection of New Hampshire Forests is again at work in the interest of the thousands of children who flock to summer camps in New Hampshire and other States in the Northeast. At the invitation of Philip W. Ayres, forester of the society, a number of camp counselors met on June 18 at Camp Kehonka, near Wolfeboro, N. H., for a week's conference on the teaching of forestry and woodcraft in camps for children and young people. Participants in this conference included W. R. Mattoon, extension forester of the United States Forest Service; G. H. Collingwood, forester of the American Forestry Association; and E. V. Jotter, professor of forest administration and protection in the University of Michigan. Through the pooling of information and experience by those attending the conference there was brought together a body of material on summer camp forestry, hiking, and camping which Mr. Ayres plans to use in preparing a manual on the subject.

Professor Jotter will spend the summer visiting camps in New Hampshire as an itinerant advisor on forestry teaching. In this work he is employed cooperatively by the society and the owners of the camps.



For the second time a short course in forestry is being given at the State Teachers College at Hattiesburg, Miss. The course, of 12 weeks' duration, began April 15 under the direction of J. F. Dubuar, head of the New York State Ranger School. In offering it the college has the cooperation of the Mississippi Forestry Commission.



Farm forestry is to be a required subject for students of agricultural science in the Alabama Polytechnic Institute, Auburn, Ala., beginning with the fall of 1929. The required work will consist in a one-semester two-hour lecture course given by J. W. Hyde, assistant professor of landscape gardening.



The 27-acre tract adjoining the campus of the University of Idaho that was leased by the university for several years for nursery and arboretum purposes has now been purchased by the university. This gives the forest school some 40 acres for its permanent use as a nursery and arboretum.

Ohio Extension Forester Starts Series of Demonstration Forests

In the five weeks beginning April 1, Extension Forester F. W. Dean moved rapidly over 25 counties of Ohio, leaving behind him a trail of newly planted demonstration forests. Mr. Dean followed a schedule arranged in advance with county agents, calling for 61 planting demonstrations on farms, at schools, and on city property set aside for municipal forests. He had no trouble making connections with the necessary planting stock, for the light truck in which he traveled carried a load of trees from the State forest nursery at Marietta. Other items in his equipment were a series of enlarged photographs of forest plantations in Ohio showing the development of the trees after periods of 5, 10, 15, and 20 years in the field, and a stock of bulletins on different phases of forestry work. The itinerary took the logical course from south to north, beginning in Jackson County, near the Ohio River, and ending in Geauga County, close to Lake Erie. Aside from the planting demonstrations, on this trip Mr. Dean made many farm visits and gave five forestry lectures before schools and civic organizations.

Demonstration Plantings at New York Fairgrounds

In connection with the State forestry exhibits shown annually at county fairs in New York under the supervision of George Stevens, the State conservation department has begun to establish demonstration reforestation plots at fairgrounds. Plots have been established at Cambridge, Chatham, Cobleskill, and Altamont county fairgrounds, and are to be planted this fall at several others. Usually a strip about 40 feet wide and 100 to 200 feet long is planted with 3 or 4 year transplants of various species distributed by the State forest nurseries.

A feature of the forestry exhibits at fairs that arouses interest and has follow-up value is the guessing contest. A pile of pine cones is exhibited, and the person who makes the best guess in regard to the number of cones in the pile is given a prize of 1,000 little trees for planting.

Youthful Planters at Work in Minnesota

A municipal forest was dedicated by Ely, Minn., this spring, when the Ely Forestry Club planted trees on several acres of a hill adjoining the local golf course. The members of the club are high school and junior college boys. The planting was no unpremeditated

affair, for the 3,000 4-year-old Norway pines used had been cared for by the boys in transplant beds since 1927. Extension Forester Parker O. Anderson writes that the dedication exercises, held in Forest Week, aroused much local interest. It is planned to continue planting until this fall, which commands a view of the city, is entirely forested.

This year 120 4-H club members were enrolled by Mr. Anderson for forest planting, which is a new 4-H activity in Minnesota. More than 100 of the children will grow Norway pine seedlings, with the plan of transplanting them in a year or two and later using them for farm shelter belts and woodlots.

Field Trip for Juniors in Idaho School of Forestry

Eighteen juniors of the School of Forestry, University of Idaho, left Moscow on May 19 for the field trip that will hereafter be a part of the junior instead of the senior year's work in this school. The first destination of the crew was the headquarters of the Clearwater Timber Co., 12 miles out of Pierce, Idaho. On the extensive logging operations of this company, which recently adopted a new diameter-limit cutting plan, the students were to lay out plots on which different systems of marking would be used with the view of determining their effect on the growth of the residual stand, make time studies to determine operation costs, and collect forest insects for laboratory study. Later the class was to move to the Northern Rocky Mountain Forest Experiment Station, near Priest River, Idaho, where Gerhard Kempff, who resigned from the station staff in 1928 to become an associate professor in the Idaho school, would direct them in a study of some of the projects under way.

The first public school forests established in Wisconsin were acquired in 1928 by school districts in Forest County. The schools of Crandon received 40 acres of land for school forest purposes as a gift from the Keith & Hiles Lumber Co., and those of Wabeno received 40 acres from the G. W. Jones Lumber Co. During the same month an 80-acre tract was acquired by the school district of Laona. School forests have since been dedicated by the Goodman School, Marinette County, and the Cassian School, Oneida County.

At Mountain Home, Ark., 4-H club boys and girls busied themselves this spring in planting black walnuts on abandoned land and on scraps of idle farm land such as fence corners and openings along creeks. Their plantings totaled 16 acres, County Agent H. D. Green reports.

Forestry Work by Los Angeles Public Schools

In teaching forest values and the destructiveness of forest fires the public schools of Los Angeles, Calif., make use of a 250-acre tract leased by the city on the Angeles National Forest. The land lies on the Clear Creek branch of the Tujunga Creek, in the midst of a 7,000-acre area that was burned over in 1925. A camp has been established with dormitory accommodations for 48 boys. Boys above the sixth grade are brought out in groups of about 20 from the various grade and high schools of the public school system, each group under the care of an agriculture teacher, to camp a night and a day. While in camp each boy does at least two hours' work a day. During winter and early spring the work consists in planting trees; at other times it may be gathering seed, making trails and fire lines, or extending the water system. Four hundred feet of seed beds 6 feet wide have been developed, all under an ample supply of water piped from a tributary canyon. This spring the seed beds contained more than 10,000 1-year-old trees, mostly of Coulter and knobcone pine; in addition 2,000 trees of the same species in tar-paper pots were ready for planting. Aside from their tree-planting work, the boys collect and scatter seed of chaparral species, in an endeavor to substitute more desirable species for those that form a particular fire menace.

Before this plan had been in operation for three years about 3,000 boys had done their bit at the reforestation center.

At nearly 100 of the Los Angeles grade and high schools native trees and shrubs are propagated in agricultural plots and gardens. Pupils are encouraged to take these trees and shrubs for home planting.

Ohio Township Does a Good Job in Observing Arbor Day

Celebration of Arbor Day in Fairfield Township, Columbiana County, Ohio, on April 26 was not left entirely to the school children and their teachers. About 40 men of the community joined in planting trees on the grounds of the township's centralized schools and on an adjoining area of several acres. The same men had given an entire day of the preceding week to preparing the ground. The planting was arranged for on the initiative of the local parent-teacher association and was supervised by Extension Forester F. W. Dean and County Agent Floyd Lower. On slopes and banks were planted 500 northern white pine and 500 Norway pine received from the State department of forestry, and near the school buildings larger trees, including specimens of elm,

sugar maple, white ash, and oak, brought by the pupils, were set for shade purposes. The celebration was completed with a picnic dinner and an afternoon program given by the school.

Intensive Forestry Activity at Milwaukee High School

A lively interest in forest conservation has developed in the Boys' Technical High School of Milwaukee, Wis., where for four years the students have been learning about forestry under the direction of S. W. Strothman. Mr. Strothman holds a master of forestry degree conferred by the University of Michigan, and before he became a teacher of science in the Milwaukee school was for five years a member of the United States Forest Service. In Milwaukee parks, thrifty plantations of evergreens testify to the correctness of the planting methods used by "Tech" boys in 1925. At the State teachers' convention the boys have distributed thousands of forest conservation pamphlets, and at both the teachers' convention and Milwaukee social centers they have exhibited 10-foot-square forest-area models of their own make, constructed with wood, screen wire, cement, and hand-carved trees, illustrating forest-fire losses and forest management. Hundreds of bird houses have been built by the boys and presented to the local chapter of the Izaak Walton League for installation on its wild-life refuge. The school weekly, the Craftsman, has given prominence to forestry subjects and in connection with the 1928 observance of American Forest Week published a 4-page forestry supplement. This spring the boys very successfully showed a "Keep Wisconsin Green" exhibit at the Outdoor Exposition held in Milwaukee May 4-10, the State conservation commission paying the expenses of the exhibit. Three hundred boys have been organized as the Boys' Tech Forest Service, each of them earning his membership by passing a test based on the American Tree Association's Forestry Primer. Various grades in this organization are attained by passing tests on Parts I and II of A Primer of Forestry, by Gifford Pinchot, learning to estimate and measure the diameters of trees, identifying tree species, learning correct methods of tree planting, etc.

A 10-acre plot of land near Wauwatosa belonging to Milwaukee County was set aside in 1928 by the county park board for use by the boys of the technical high school as a demonstration forest.

Forest rangers of the Louisiana Division of Forestry expect to reach practically every boy attending a Boy Scout or 4-H club camp in the State this summer. Every ranger will visit a number of camps, spending several days at each, teaching the boys to identify tree species and to guard against forest fires.

Ohio 4-H Forestry Clubs Grow

In one year's time extension workers in Ohio have made two 4-H club foresters grow where but one grew before. Clubs in 12 counties of the State report 205 new members this spring. Seven other counties have such clubs. The new members accounted for the planting of 210,000 trees sent to them from the State nurseries at Wooster and Marietta, each member receiving enough 2-year seedlings to plant an acre of land. On the farms of Trumbull County alone new forestry club members reforested 60 acres.

Now that planting is off the calendar for this year the clubs are busy with tree identification and with plans for forestry exhibits at county fairs. First-year requirements of a forestry club member include the identification of 15 native forest trees of commercial importance in his home section.



High-school children in 11 counties of North Carolina were invited this spring to write essays on "Why we should conserve our forests and game," in competition for prizes offered by Assistant State Game Warden George A. Nicoll, of New Bern, out of his own pocket. In each county contest a prize of \$5 was offered, and in the intercounty contest a prize of \$10.



A permanent forestry exhibit is being installed in the State Capitol of Idaho, through cooperation of the State chamber of commerce, the State university, timber operators, and the United States Forest Service. Forest resources of Idaho and the locations of sawmills and power plants are shown by a large pictorial map of the State. Four large cases display models, pictures, and samples of the State's various wood products, and fire-protection equipment. Samples of wood of different timber species and of lumber of various grades are exhibited in racks, and 34 colored transparencies tell the story of the value of forestry to the State from the standpoints of lumbering, grazing, water-power development, irrigation, domestic water supply, and recreation.



An effective feature of an exhibit displayed last fall at the Eastern States Exposition, Springfield, Mass., by blister-rust control agents was a sign bearing Agent William J. Endersbee's slogan—

White pine will grow
Where the plow can't go.

Extension Service Promotes Planting
Work in New York State

The spring planting season of 1929 found farm bureau forestry committees on the job in 30 counties of New York State. With the aid of the State extension service these committees worked out forestry programs for their respective counties, and their efforts are credited by Assistant Extension Forester Gillett with causing the planting of millions of trees on county-owned land as well as on idle acres of farms.

Nine hundred 4-H club members this spring claimed the 1,000 young trees which New York State provides without charge to each boy or girl enrolling in a 4-H forestry project outlined by the extension service. In counties where 4-H forestry clubs were active the service held tree planting demonstrations, which were attended not only by club members but by 1,800 adults.

County Agent Hires Audience for
Forestry Talk

One way to assemble auditors for a farm forestry talk is to hire them, County Agent A. G. Hendren has proved in Wilkes County, N. C. Mr. Hendren has been trying for several years to arouse an interest in woodland management among the farmers of the Gilreath community, the North Carolina Extension Service reports, without succeeding in getting them to meet for a forestry talk. When Extension Forester R. W. Graeber recently paid a visit to Wilkes County Mr. Hendren asked 10 neighbors to come over with their axes and do a little work for him for hire. While cutting 10 cords of wood the farmers were exposed to the farm forestry idea so effectively that each one of them agreed on the spot to undertake better management of his woodlands.



In Susanville, Calif., where the headquarters of the Lassen National Forest are located, forest officers have placed in the high-school library a show case containing fruiting bodies of common forest fungi and characteristic examples of decayed wood. Each specimen is accompanied by a brief description giving the general characteristics of the fruiting bodies and mycelium, outlining the life history of the fungus, and telling whether the fungus is found on living or on dead trees. It is planned to change the exhibit frequently, showing various subjects such as leaves and cones of common coniferous trees, wild flowers and grasses, and insects with examples of their work.

Forest Service Notes

Five Years' Fires on the National Forests Tall Spruce Build Alaskan Salmon Traps

By J. M. WYCKOFF, United States Forest Service

In the 5-year period ending with 1928, fires on the national forests were held down to an annual average of less than one-third of 1 per cent of the total national forest area. The California National Forest District, afflicted with three bad fire years during the period, suffered the most widespread burning; an average of 1.083 per cent of its national forest area was burned over in each year of the five. The next most unfortunate district was the eastern, with yearly burns covering an average of 0.867 per cent of its national forest area. On the national forests that take in more than 20,000,000 acres of rain-soaked southern Alaska, the average proportion burned over annually in the 5-year period was only 0.014 per cent.

Since 1919, a year when fire conditions were exceptionally bad in the northern Rocky Mountain region, no year's fires have covered so much as three-fifths of 1 per cent of the total area of the national forests.

Northern Pacific Land Grant Act Saves National Forest Lands to the United States

An act approved by President Hoover on June 25 removes from the operation of the land grants made by Congress to the Northern Pacific Railway Co. under the act of July 2, 1864, the national forest lands that have been involved in the controversy between the company and the Forest Service, providing in this connection that the company shall be entitled to whatever compensation for the lands the courts may hold to be due. The act declares a forfeiture of the unsatisfied indemnity selection rights of the company, and provides for the institution of court proceedings to determine the disputed questions of law and fact that were considered by the joint committee of Congress which has been working on this case for five years.



The fiftieth kiln-drying course of the Forest Products Laboratory, given April 1-12, 1929, had an enrollment of 14, including 11 industrial representatives, an inspector of the Southern Pine Association, and representatives of the Government of Finland and the University of Commerce of Stockholm, Sweden.

Anyone who is under the impression that the spruce forests of Alaska are dwarfed in comparison with those of the Pacific slopes in the States ought to see some Alaskan salmon traps. The salmon pack of southeastern Alaska is caught largely by means of a structure known as a floating trap, the frame or form of which is built of spruce logs. In order that they may be held in place on the rough coast throughout the fishing season, the traps must be constructed of the largest of logs. To construct one of the trap frames requires 15 logs ranging from 90 to 160 feet in length.

Full-tree logs suitable for fish-trap construction bring a much higher price than can be gotten for the same timber at the sawmills. Therefore it pays the logger to use care in felling and yarding so that he can offer logs of the lengths needed by the trapmen. Each year several million board feet of spruce are selected for fish-trap construction from the areas logged on the Tongass National Forest, Alaska.

An idea of the size to which Sitka spruce can grow in Alaska may be gathered from a tabulation of the size and volume of 15 spruce fish-trap logs cut from a total stand of 200,000 feet board measure on Prince of Wales Island, Tongass National Forest. These trees were yarded with a 60-horsepower Best tractor engine mounted on a donkey frame. The maximum haul was 900 feet. The dimensions were as follows:

Log length (feet)	Top diameter (inches)	Volume (board feet) Scribner Decimal C
88	33	6,840
96	46	12,110
108	26	6,740
116	29	8,900
120	27	9,400
120	18	4,990
130	26	5,230
130	19	7,110
136	16	5,430
138	23	10,280
142	20	10,980
144	20	8,210
144	16	7,850
146	20	8,960
158	17	13,820
¹ 1,916	¹ 1,356	¹ 126,850
² 127.7	² 23.7	² 8,456

¹ Total.

² Average.

Fires Long Ago

In the western yellow pine forests of the Southwest, on favorable sites where protection from fire and grazing is adequate there are fairly large areas of excellent young growth from 10 to 40 years old. Early explorers in this region described the western yellow pine stands as comparatively open, with no great amount of reproduction. The question as to why these forests, now proving their ability to develop heavy reproduction, were not reproducing on a similar scale 400 years ago, finds an answer in a reading of the stump of a western yellow pine felled on the Carson National Forest in 1923 at the age of 345 years. Walter J. Perry, while in charge of the Hallack & Howard sale on the Carson Forest, studied the stump of this tree and found that the tree had experienced 14 fires severe enough to scar its base. The years in which these fires occurred were 1629, 1663, 1682, 1705, 1718, 1748, 1758, 1796, 1810, 1817, 1824, 1839, 1844, and 1874. Thus the nonreproductive period of the forest in which this tree grew was distinguished from its present reproductive period by the frequent occurrence of severe fires.

Trees on Shifting Shores in Alaska

By J. A. THAYER, United States Forest Service

On the shores of Prince William Sound, Alaska, trees serve as indicators of the shifting relationships of sea and land surfaces. As early as 1794 the English explorer George Vancouver observed that the seas were encroaching upon the shores of the sound; the gradual subsidence of the shore line is now very noticeable, especially in the vicinity of Montague and Hinchinbrook Islands. At various points along the shores of the two islands there can be seen partially submerged remains of forests, the dead stumps standing in situ on the tide flats. As the land subsides the sea in many cases is building long, narrow bars or dykes of gravel along the seaward side of the bottoms, inclosing lagoons of brackish water. The tops of these bars are at about the level of the highest reach of the tides, and several feet higher than the flats where the dead trees stand. On some of the bars trees close to maturity have had from 4 to 6 feet of their stems buried by the continued accretions of gravel and debris washed up by the waves. Many of the bars support a growth of young trees, clearly denoting a recent extension of forest growth to newly built-up land.

At the head of Boswell Bay, on the easterly end of Hinchinbrook Island, a forest area of some 100 acres has been drowned out by the sinking of the land. Directly south and east of this area there has recently been built up an area of sand dunes, about 2 miles long and three-fourths mile wide. The side of the dune area farthest from the open seas is covered with a growth of pure spruce about 120 years of age, without any sign of older timber having occupied the ground

previously. The age of the stand gradually diminishes to seaward until within 200 yards of the sea only a few scattered seedlings are to be found among the beach grass and willows. Evidently this area of dune lands has been built up in not much more than 150 years and is still being added to.

In this place the rapid deposit of soil can be largely ascribed to the great amount of sediment borne to sea by the Copper River and carried westward by the ocean current. The sediment deposited by wave action is formed into dunes by the strong easterly winds blowing across the open Gulf of Alaska.

Grazing Versus the Pine Tip Moth

In a western yellow pine plantation on the Nebraska National Forest, trees on a plot grazed by horses and cattle every year since the plantation was established in 1920 have made better height growth than trees on an ungrazed plot. No specimens have been lost on either plot. In June of 1920 the height of the 90 trees on the test plot averaged 19.1 inches and that of the 90 trees on the ungrazed check plot averaged 19.19 inches. In September, 1928, the average height was 57.82 inches on the grazed plot and 54.38 inches on the ungrazed plot. Greater annual growth was made by the trees on the grazed plot in six out of the nine years. Tip moths injured a greater percentage of the trees on the ungrazed than on the grazed plot in each of six out of the nine years, and over the 9-year period the average annual percentage of trees injured by tip moths was nearly 4½ per cent greater on the ungrazed than on the grazed plot.

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Douglas firs grown at a density of only 40 per square foot of seed bed and planted in the field as 2-year seedlings have survived as well as the standard 1-1 transplants, in a test conducted on the Columbia National Forest, Wash., under the direction of J. F. Kummel. The seedlings were root pruned in place at the beginning of their second year, at a depth of 4½ inches. Trees grown at a density of 80 per square foot and planted on the Columbia and Rainier National Forests as 2-year seedlings had a mortality greater than that of 1-1 transplants by from 5 to 18 per cent—not enough to offset entirely the advantage of their lower cost. Further experiments are being made in an effort to find a way to produce good Douglas fir planting stock without the expense of transplanting.

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The Southern Forest Experiment Station and the office of the district inspector for Clarke-McNary work in the Gulf States are moving about August 1 from the customhouse, New Orleans, to the Stern Building, Baronne Street, New Orleans.

Commission Approves Purchase of 118,000 Acres for National Forest Purposes

Government purchase of 118,058 acres of land in the Eastern and Lake States for national forest purposes was approved by the National Forest Reservation Commission on May 15. The purchase program approved represents expenditure of \$546,808, or an average of \$4.63 per acre. The largest tract included is one of 93,764 acres in the new Osceola purchase unit, in Florida. Authority was granted for purchases adding 10,831 acres to the Superior National Forest, Minn., 2,681 acres to the Alabama National Forest, Ala., and 1,361 acres to the Monongahela National Forest, W. Va. Among other areas approved for purchase at this meeting of the commission are 5,094 acres in the Georgia purchase unit, Georgia, and nearly 3,000 acres in the Mackinac and Marquette purchase units, Michigan.

Electric Drill and Dynamite Give Good Results in Felling Snags

Power boring and blasting proved not only much quicker but decidedly cheaper than hand sawing as a method of felling snags, in Forest Service experiments made in 1928 in the Wind River Valley of southern Washington. The experiments were carried out mainly on the Columbia National Forest, the forest on which snag felling necessitated in 1927 by disastrous fires of that year cost the Government \$45,000. The tests were performed by officers of the Columbia National Forest and research men of the Northwestern Forest Experiment Station. The snags felled were typical of the Douglas fir region. Most of them were the result of the 1902 fire. Nearly all were Douglas fir. The majority were solid at the base except for the sapwood and spots of rot. Labor was figured at 48 cents per hour, powder at \$14.04 per hundredweight f. o. b. Portland, and caps at \$7.20 per 100.

To get figures on the cost of felling by hand sawing, time was kept on two sets of experienced fallers who were clearing the right of way of a new road. In the felling of 197 snags, the average cost of felling a single snag was found to range from 30 cents for the 11-20-inch diameter class to \$3.84 for snags having diameters of from 61 to 70 inches. In the opinion of foresters of the Northwestern Forest Experiment Station, for felling with the cross-cut saw on old burns these costs were probably above the regional average, because the ground was rough, springboards had to be used on many trees, and 19 per cent of the snags were pitchy; but on cut-over land where the snags are badly scattered the sawing costs might be even higher.

On 90 snags near the place where the sawing tests were conducted a trial was made of felling by boring and burning. The boring was done with a portable electric drill and a 1-inch barefooted ship auger, driven by a 1½-kilowatt Delco generator mounted on an auto truck. Connection between generator and drill was by several hundred feet of electric cable mounted on a reel in the truck. The crew consisted of two men regularly employed on a road construction job on the Columbia National Forest. One ran the drill and one moved the truck, relaid the cable, and cared for the generator. The second man was busy in this experiment not more than half the time, and the boring could probably have been done more cheaply by one man. In each of the snags a horizontal hole was bored, and a sharply inclined hole was bored so as to meet it near the middle of the snag. Sometimes the two holes were bored from the same side of the snag; sometimes from opposite sides. When the fall rainy season made burning operations reasonably safe the bored snags were fired, by a variety of methods. In some cases gasoline, kerosene, or crankcase oil was poured into the hole and ignited; in some a charge of thermit was ignited in the hole, the flame of a Hauck torch was directed into it, or a lighted railway fusee was poked in. Fuels used in the holes included the following: Gasco briquets, kerosene or oil soaked shavings, kerosene or oil soaked charcoal, and pitch splinters. Charcoal, dry and combined with charcoal soaked in kerosene, was ignited in the hole by means of torch, fusee, or thermit. Most of these burning methods proved ineffective. Even with the nozzle of a Hauck torch held at the draft hole for half an hour, some snags failed to stay afire. Heavy oils in the hole made ignition almost impossible. Kerosene poured in the holes seldom gave permanent ignition. Thermit gave successful ignition on some damp and refractory snags but failed on others.

In the method found most satisfactory, two or three bits of charcoal saturated with kerosene are rolled down the vent hole so that they lie at the junction of the vent and the draft hole. Then with a small hand bellows a draft is forced through the holes. From time to time one or two pieces of dry charcoal are added. Sometimes reignition and tending become necessary. When trouble is experienced in starting the kerosene-soaked charcoal, an inch of railway fusee is lighted and poked into the hole. Once ignited, the fire begins to burn out a chamber and tends to back out the draft hole. If the draft hole becomes much enlarged the fire dies down and the effort to fell the snag by burning is almost certain to fail. For this reason, few of the larger snags burned until they fell.

Of the 90 snags in this test 64 were actually felled by burning. In calculating the cost of felling by boring and burning the expense of the work done on the 90 snags, including the tests made with all the different burning methods, was divided among the 64 cases in

which the snags were actually felled by such means. The cost per snag felled ranged from 13 cents for the 11-20 inch diameter class to \$1.83 for snags with diameters ranging from 61 to 70 inches. In an extensive operation of the same conditions the cost would probably be lower. The boring time per snag was uniformly low, ranging from 18 man-minutes for 21-30 inch snags to 48 man-minutes for 61-70 inch snags. Since there was but one pair of holes to each snag, the cost of boring did not increase proportionately to the size of the snag. The difference between the time requirements for boring small and large snags was due largely to the greater difficulty in matching up the holes in the latter. Ignition cost did not vary much with size of snag. There was great variation in the time required for ignition by individual snags of the same size. For most of the diameter classes the average time required for ignition ranged from 30 minutes to 60 minutes.

Boring and burning appears from the results of these tests to be somewhat cheaper than sawing. Disadvantages of this method are the lack of control over the time or direction of fall, failure of about a quarter of the snags to burn enough to fall, the leaving of some of these in bad shape to be brought down by other means, the danger of injury to men working among the half-severed snags, and the necessity for suspending operations during dry spells because of the danger of starting surface fires.

In tests of boring and blasting, the boring was done with the same apparatus as in the tests with burning. In these tests the Forest Service had the technical advice on the ground of representatives of the Du Pont Co. Various arrangements of holes and types of powder were tried. As a starter 40 snags were shot off to try out the technique and equipment, then 169 snags were bored and blasted with careful recording of method, time, and results.

The crew consisted of an auger man, a powder man, and a truck driver. The driver, even though he helped the others, was busy only about half the time. Toward the last a two-man crew was used with good satisfaction, although some time was lost when the truck had to be moved or the generating plant needed refueling or other attention. The 1-inch auger made about 6 inches of hole a minute, including moving time, 18 to 24 inches a minute when actually boring.

Best results were obtained when holes were drilled upward from one side and downward in the same plane from the opposite side. The number and depth of the holes needed varies with the diameter and condition of the snag. The holes should be parallel and should be deep enough to hold about 4 sticks of dynamite when loaded to within 2 inches of the surface. In general, the holes should be about 15 inches apart. They need not go to the center of the tree.

The explosives used ranged in strength from stump-ping powder to T. N. T., or approximately from 20 per cent to 80 per cent dynamite; 40 per cent dynamite was found best suited to this work and was most largely used.

In simultaneous detonation of two or more charges in a snag best results were obtained by using electric caps and a blasting machine. Cordeau may be used for detonating isolated trees where the blasting machine can not be used conveniently, but it takes time to connect up all the charges and the length of cordeau required is expensive.

The amount of boring and the loads required for snags of different sizes are indicated in Table 1.

TABLE 1.—Number of holes and number of sticks of 40 per cent dynamite required in experiment to fell snags of various sizes

	Diameter classes (inches)					
	11-20	21-30	31-40	41-50	51-60	61-70
Number sticks ¹	1-3	3-7	7-12	12-18	18-26	26-35
Number holes.....	1	1-2	2-3	3-5	5-7	7-9

¹ 4 sticks to the pound.

A rule of thumb evolved from this experimentation is that the area of the cross section of a snag at breast height, in square inches, divided by 110, gives the number of sticks of 40 per cent dynamite required to fell the snag.

The labor cost for the boring and blasting method was very much less than that for sawing, for all sizes of snags. The cost of explosive, of course, formed a large item of expense. The total cost of the blasting method ran under that of sawing by 3 cents per snag of the 11-20 inch diameter class and by \$1.65 per snag of the 61-70 inch diameter class.

Costs for all the fellings included in the experiment are given in Table 2.

TABLE 2.—Computed cost¹ of felling snags of various diameter classes by various methods

Method	Number of snags	Diameter classes (inches)					
		11-20	21-30	31-40	41-50	51-60	61-70
Sawing.....	197	\$0.30	\$0.53	\$1.02	\$1.61	\$2.23	\$3.84
Burning.....	² 64	.13	.56	.70	.72	1.84	1.83
Blasting:							
Labor.....		.13	.23	.34	.57	.50	.70
Explosives.....		.14	.21	.46	.71	1.10	1.49
Total.....	161	.27	.44	.80	1.28	1.60	2.19

¹ Labor was figured at \$0.48 per hour, powder at \$14.04 per hundred-weight f. o. b. Portland, and caps at \$7.20 per 100.

² The burning costs on 90 snags upon which work was done are charged wholly to the 64 snags that actually fell.

To test control of direction of fall in blasting, a record was kept on 60 snags along a road. Of this lot 43 per cent fell in the direction desired and 44 per cent more fell within 50 degrees of it.

Girdling the snag with a piece of discarded cotton fire hose filled with dynamite was found to be an unsatisfactory method of felling, as in earlier Forest Service experiments described in the Forest Worker of July, 1928. One 28-inch snag remained standing when 7.4 pounds of T. N. T. had been used on it in this way. Furthermore, the external charge scatters fire. Poor results were obtained, likewise, from blasting with the charge in the ground under the snag. This method might work better with shallower rooted snags like hemlock or spruce, or where there were a great many tall leaners that needed little to get them off balance.

Where snag felling is done in a logging operation simultaneously with the felling of green timber it is probably more convenient to use the same method on the snags as on the green trees; in fact, it would be rather inconvenient to have explosives used under such conditions. But where snag felling follows logging as a separate operation or where any great number of dead trees are to be felled to make firebreaks or to reduce the fire hazard on old burns or logged-off lands, it appears from these experiments that the operator may do well to give power-boring and blasting a trial.

The next phase of this project is the devising of a light portable power unit that can be used in the woods at a distance from roads. Experimentation is in progress on a very light gasoline engine unit, to be directly connected to a drill with flexible shaft, and also on a light engine unit suitable to run a generator, which in turn would operate an electric drill like that used in these experiments.

Slash Disposal in the Northeast

On the basis of several years' study of the results of different methods of treating logging slash in New England, the Northeastern Forest Experiment Station reports that rapid decay of the slash is favored by moderate moisture and warmth. Extreme conditions found unfavorable to rapid decay are quick and excessive seasoning such as may occur on warm slopes, and waterlogging.

In general, the station finds lopping can hasten but little the decay of slash of less durable woods such as aspen, poplar, paper birch, and basswood—so little, in fact, that the expense is not justified. Usually the advantageous results of lopping maple and beech slash are too slight to justify the expense. Yellow birch hardly ever should be lopped, because it is particularly subject to waterlogging. In most situations it is desirable to lop the tops of ash, chestnut, and oak.

Dense softwood slash is found not only to crush and kill the advance reproduction beneath it but to prevent

the establishment of new reproduction for a period of from 15 to 20 years. Lopping softwood tops does not improve conditions for existing or incoming seedlings. Winter burning as logging progresses is found to be a better method of disposing of softwood slash. Hardwood slash rarely hinders reproduction seriously for more than 5 or 6 years. Hardwood tops if left unlopped are sufficiently open to permit a certain number of seedlings to push their way through without undue interference; lopping them increases the chances for smothering seedlings.

Noble Fir Requires Northern Exposure for Good Survival in Plantations

In three series of experiments on the national forests of western Oregon and Washington, and in plantations covering 2,801 acres of these forests, noble fir has survived on north exposures almost as well as the Douglas fir that was planted with it. On west and east slopes, where moisture conditions are less favorable, its survival has been considerably lower than that of the Douglas fir, and on the still more severe south exposures it has sunk lower yet in the comparison. The difference in survival between the two species was greater on pumice soils than on clay loam soils. The planting stock used was 1-1-1 and 2-1 transplants.

In the one series of tests in which part of the planting was done in the fall, noble firs planted in the fall showed no decided inferiority to those set out in the spring. In the two series in which the influence of size of planting stock on survival was noted, the larger trees survived in appreciably higher percentages than smaller stock of the same age. On the two plots where the cover of moss and sod was removed from around the base of the trees at the time of planting, no appreciable effect on survival was noted.

Noble fir (*Abies nobilis*) is a species of considerable importance in the upper slope forests west of the Cascade Divide in Oregon and Washington. While occasionally found at altitudes as low as 1,200 feet, it occurs chiefly within a range of approximately 2,500 to 5,000, or, near the southern part of its range, 6,000 feet, where it is associated with Douglas fir, western hemlock, silver fir, and other species. Although it rarely forms any large proportion of the stand, the excellent quality of its wood and its characteristically long, clean bole make it one of the most valuable trees within its type for lumber production.

The landmark known as the Holy Cross, formed by two snow-filled crevices on a mountain side on the Holy Cross National Forest, Colo., has been set aside by presidential proclamation as a national monument. The reserved area includes approximately 1,392 acres.

General Forest News

Survivals High in Plantations of Great Southern Lumber Co.

On practically all the cut-over areas planted with longleaf pine last winter by the Great Southern Lumber Co., Bogalusa, La., more than 90 per cent of the planted trees are living this summer. On some of the areas the company's forester, J. K. Johnson, finds survival percentages as high as 98. The winter's plantings reforested 7,009 acres of land, making use of 7,000,000 seedlings selected from among the 11,000,000 raised in the company's nurseries in 1928. At the present time the nurseries have a stand of 5,000,000 slash pine seedlings, which is expected to yield enough "No. 1" stock to plant 4,500 acres of denuded land.

In 1928 the Great Southern Co. achieved greater success in forest fire protection than ever before. The 303 fires that occurred during the season on the 425,000-acre area under protection burned 13,629 acres, or 3.2 per cent of the protected area. Half the fires were held to less than 10 acres.

Why the Western Pine Beetle Follows Fire

By J. M. MILLER, United States Bureau of Entomology

On the Northfork burn on the Sierra National Forest, Calif., the Bureau of Entomology recently completed the most exhaustive investigation it has yet made into the reasons for the concentration of bark beetles on burns and the nature of the relationship between fire damage and bark-beetle infestation. The results indicate that the attraction of certain species of bark beetle to burns is determined largely by the degree to which fire injury suppresses the growth of surviving trees.

The fire that burned over the Northfork area on June 22-27, 1924, was typical of severe fires that develop in the border type of western yellow pine and brush areas on the western slopes of the Sierra Nevada Mountains. It covered a total of 5,460 acres, of which 370 acres was burned by severe crown fire, 1,300 by partial crown fire, and 3,790 by ground fire. Of a total stand of 19,111,000 board feet, 3.2 per cent was killed outright by the fire. The year of the fire was also a year of drought. On this burn, as on a number of others in similar type that have been kept under

observation, a heavy concentration of bark beetles developed in surviving trees during the first two seasons following the fire. Before the close of the 1924 season, an additional 3.5 per cent of the stand died, mainly as a result of bark-beetle attacks on fire-injured trees. During the season of 1925, although the surviving trees started new foliage growth in the spring, a total of 3,698,000 board feet, or about 20 per cent of the remaining stand, was killed. In 1926 only 2.6 per cent of the stand was killed, the bark-beetle infestation returning to an endemic condition in which it remained during 1927 and 1928.

It was found that the beetles consistently selected trees partially defoliated by scorching of the needles. Trees with basal scars, due to the burning of one side of the trunk near the ground, did not attract them unless this injury was accompanied by scorching of the foliage and of cambium in the upper trunk. On the basis of sample-strip data the insect-caused mortality in different classes of fire-damaged trees that survived the fire was estimated as follows:

Class of injury and percentage of stand, by volume, killed by insects

I. No fire injury.....	0.9
II. Less than 25 per cent of crown defoliated..	7.0
III. 25 to 50 per cent of crown defoliated.....	51.6
IV. 50 to 75 per cent of crown defoliated.....	76.9
V. 75 to 100 per cent of crown defoliated....	44.2

Class V contained a high percentage of young, vigorous trees scorched by ground fires. These trees apparently were not attractive to bark beetles. Class IV, which had a lower survival, contained a higher percentage of large trees.

The western pine beetle (*Dendroctonus brevicornis* Lec.) was the insect most largely responsible for the killing of trees subsequent to the fire, accounting for about 75 per cent of the total loss by volume. Conditions in the fire-injured trees, especially in those only partially defoliated, were found to be unfavorable for the brood development of this beetle. The ratio of successful progeny to parent beetles was less than that which usually occurs in attacks on normal trees. It was for this reason, apparently, that an aggressive epidemic was not built up and the infestation subsided as soon as the supply of trees rendered susceptible by fire injury was exhausted.

The cycle of western pine beetle infestation on adjoining areas was similar to that within the burn,

with an increase in 1924 and 1925 and a decrease in 1926, although increase and decrease were both much smaller than those that occurred on the burn.

It was found that a high percentage of the trees selected by the western pine beetle were trees that had made little or no growth since the fire. All defoliated trees on the burn received a severe setback in growth as a result of fire injury combined with the drought conditions of 1924. Of the trees attacked by bark beetles up to the close of the 1926 season, 96 per cent had made little or no perceptible growth since the fire. Many of the heavily defoliated trees formed no perceptible growth rings in 1925 and 1926, although they put out new foliage during these seasons; and those surviving to October, 1928, formed only suppressed rings during the seasons of 1927 and 1928.

Observations made within the burn and on trees on another area that were scorched by experimental burning show that the western pine beetle is not attracted to fire-injured trees by odors, heat, or other immediate effects of fire. Heavily scorched trees did not attract the beetles until several months after the fire occurred, or until the growth rate had become suppressed as a result of defoliation by the fire. It is apparent, therefore, that the degree to which this bark beetle concentrates in burns of the western yellow pine type depends upon the quantity of defoliated or partially defoliated timber that survives the initial fire injury.

Timber Company Spoils a Meal for Bark Beetle

By J. E. PATTERSON, United States Bureau of Entomology

On an area near Aspen Lake, Oreg., that was burned over in June and July, 1926, the Weyerhaeuser Timber Co. has demonstrated what a combined salvage and control operation can do to prevent the usual intense concentration of bark beetles in fire-injured stands and consequent high losses of merchantable timber.

The 8,000-acre area burned had a stand of western yellow pine estimated at 60,000,000 board feet. On parts of the area only a light ground fire occurred. On 20 per cent of the burn the fire crowned and killed outright more than half the trees, causing a direct fire loss of 8,000,000 board feet. An additional 17,000,000 board feet was severely scorched and damaged.

Salvage operations were inaugurated on the burned area in the fall of 1926. In an effort to prevent a concentration of bark beetles in the fire-injured stands, control work was carried out in adjacent unburned stands. The control work was concluded the same fall and the salvage operations in the following season. About 1,500 acres of the fire area were logged. The 15,000,000 board feet of pine cut was milled on the burn.

The results were highly satisfactory. A profit above the cost of operation was realized on the salvaged stock, and the combined logging and control work prevented a bark-beetle epidemic in the injured stands. Only a slight concentration of beetles took place on the burned area following the fire, and on adjacent areas where the control work was carried out the existing infestation was reduced to a pronounced degree. On untreated burned areas studied previously in the same locality heavy bark-beetle concentrations occurred immediately following the fires, infestation increasing after the fires by from 1,100 per cent to 1,950 per cent.

United Attack on Soil Erosion Problems Planned

Plans are announced by the Department of Agriculture for a concerted attack on national soil-erosion problems by the Bureau of Chemistry and Soils, the Bureau of Public Roads, the Forest Service, and various State agricultural experiment stations. The work is to be guided by a committee representing the three bureaus and the stations, headed by A. G. McCall, chief of the division of soil investigations of the Bureau of Chemistry and Soils.

A special appropriation of \$160,000 has been made to the Bureau of Chemistry and Soils for soil-erosion studies. Experimental work carried on by this bureau to determine the susceptibility of various types of soil to erosion has indicated that 18 regional areas in this country present erosion problems so acute as to call for the establishment of erosion experiment stations. Most of the \$160,000 appropriation will go into the establishment of seven such stations. The Bureau of Public Roads will continue to work on several of the engineering phases of erosion control. The Forest Service will continue its studies to determine how run-off, erosion, and stream-flow are influenced by forest cover, chaparral, brush, and range cover, and how far they may be controlled through fire protection and through forest and range management. In the South, efforts will be concentrated upon the loess soils of areas on both sides of the Mississippi River below the mouth of the Ohio. Somewhat similar studies will be undertaken in the Upper Mississippi Basin, in the loess soils of Minnesota, Wisconsin, and Iowa. Other special work planned by the Forest Service includes reporting the results of 14 years' experimentation on the relation of range management to run-off and erosion conducted at Ephraim Canyon, Manti National Forest, Utah. The service will also study methods of preventing the silting of irrigation reservoirs in Idaho and Arizona, and will expand the erosion investigations under way at the California Forest Experiment Station.

Planting on Long-Bell and Crown-Willamette Lands in the Northwest

By C. B. MORSE, United States Forest Service

When I visited the Longview, Wash., operation of the Long-Bell Lumber Co. this spring the mills there were running two 8-hour shifts four days a week and cutting 1,000,000 board feet of lumber to the shift. A year's cutting on this operation takes the timber from 2,000 or 2,500 acres. Yet J. B. Woods, forester for the company, told me that he is planting cut-over areas as fast as it becomes apparent that they will not be reforested naturally.

In the Long-Bell nurseries at Longview 1,600,000 trees are raised each year. Two-thirds of this stock is planted as 1-year seedlings; the remaining third is given two years in the seed beds. About 800 trees are planted to the acre. The species used are Douglas fir, Sitka spruce, hemlock, redwood, Port Orford cedar, and alder. At Longview both redwood and Port Orford cedar are a long way beyond their natural range, but both have given evidence of their ability to grow there. The alder is planted along the company's abandoned railroad grades, where it is expected in from 6 to 10 years to form an effective firebreak.

In the Long-Bell plantings at Longview, seedlings of saw-timber species are mixed in the rows with equal numbers of seedlings of pulpwood species. Douglas fir, for example, is alternated with Sitka spruce or with hemlock.

In 1928, although it was considered a poor seed year, the Long-Bell Co. collected and sold more than 6,000 pounds of seed of Douglas fir and other forest tree species, shipping seed to many foreign countries.

The Crown-Willamette Paper Co., at Oregon City, Oreg., is likewise doing a lot of planting. In the nursery which it established about six years ago this company is raising Sitka spruce seedlings at the rate of 1,000,000 a year. It plants about 400 Sitka spruce per acre, expecting that the light-seeded hemlock will seed in naturally so as to form a full stand. Present planting costs range from \$8 to \$9 an acre. The company expects to reduce the cost of its nursery stock to about \$3 an acre and hold the total planting cost per acre to \$8.

This company is experimenting in the growing of cottonwood for pulp timber.



In the Pulitzer prize awards of 1929 honorable mention for disinterested and meritorious public service in journalism was given to the St. Paul (Minn.) Dispatch and Pioneer Press for their 1928 campaign for conservation of Minnesota's forests and other natural resources. The twin newspapers were nominated for the prize by Raphael Zon, director of the Lake States Forest Experiment Station.

European Pine-Shoot Moth Discovered in Florida

By PERKINS COVILLE, United States Forest Service

An insect found infesting immature cones of a long-leaf pine in Florida has been identified by August Busck, National Museum specialist on Lepidoptera, as the European pine-shoot moth. The identification was made in Washington, D. C., on branch tips and cones from a tree on the Kingsley tract near the Starke, Fla., branch station of the Southern Forest Experiment Station. This tree had been used in cross-pollination experiments, and removal of pollination bags from the flowers had disclosed the fact that a number of the small cones were badly infested.

Evetria buoliana, the European pine-shoot moth, was first reported in the United States 15 years ago, when it was discovered on Long Island. Since that time it has spread to the Middle Atlantic States and through the New England States to southern Canada. This is the first time that it has been recorded south of Washington, D. C. In the North it seems to confine itself in general to ornamentals, and has not become a serious pest. In parts of Europe, however, it is a very serious pest. Possibility of great harm resulting from its activities in the South is suggested by the fact that the long southern growing season may enable it to develop four or five generations a year.

Discovery of this insect on the Kingsley tract creates the suspicion that it may have caused the recent death of certain trees on the tract. In March of this year F. C. Craighead, in charge of forest insect investigations of the Bureau of Entomology, and I examined four of these trees without succeeding in determining the cause of death. The wood of the trees was sap-stained and the inner bark was alive with insects that had entered since the trees' death. The foliage, some of which was still green, seemed to have died back uniformly from the tips. Although the trees had been dead but a short time, the buds were loose and were easily pulled off. The tissue at the base of the buds had been partially eaten away. Junior Forester V. L. Harper (who later discovered the insect) and others had noticed for the last two years that in the vicinity of Starke, although each cone crop seemed to make a good start and develop well to a certain point, mature cones were abnormally scarce. Doctor Craighead did not find the damage upon the dead trees at Starke typical of that produced by the European pine-shoot moth on northern species. Species like jack pine when attacked by this moth develop a very irregular leader that grows crookedly back and forth, and that may stay alive for some time. At Starke no irregular growth of the leader was noticed.

The larva or caterpillar of the European pine-shoot moth is dark brown, with a deep black head and with a black shield on the upper part of the first division of the body behind the head. Allied species are lighter in

color. The full-grown larva is two-thirds of an inch in length. The Department of Agriculture will appreciate full particulars on any discovery in the South of insects answering this description or of injury to trees such as that described in the foregoing. It is hoped that every one in a position to do so will watch for signs of the insect and its damage and send any likely material to Dr. F. C. Craighead, Bureau of Entomology, United States Department of Agriculture, Washington, D. C.

Why Men Become Foresters

By F. H. EYRE, United States Forest Service

In an effort to find out something about the background, motives, and tastes of men fresh from school seeking Government employment in technical forestry work, a simple questionnaire was circulated to 163 men recently graduated from forestry schools in the United States who have applied for such employment in 1929. A query as to the type of community in which they were reared brought answers from 142 of the men, revealing that 33 per cent of them were farm bred as compared with 17 per cent coming from cities of more than 100,000 population. Villages under 1,500 population had produced 9 per cent of the group reporting, towns up to 15,000 population 31 per cent, and small cities 10 per cent.

Statements as to reason for choosing forestry as a profession that were definite enough to tabulate came from 108 of the men. These indicate love of outdoor life as the predominating motive. More than one-fifth of the answers gave actual experience in woods work as the primary basis of the choice. Almost as many answers, none of them coming from farm-bred boys, attributed the decision to the romantic appeal of forest life as experienced through reading and through Boy Scout activities, etc. Interest in conservation of forest resources and in natural sciences appeared as the prime motive in a few cases each. Correlated with type of boyhood-home community, the motive answers classify as follows:

Motive in choosing forestry as a profession	Type of home community					Total
	Farm	Village	Town	Small city	Large city	
Love of the outdoors.....	12	9	13	8	3	45
Early experience in woods work, etc.....	17	4	3	0	0	24
Romantic appeal of forest life as experienced through reading, etc.....	0	0	4	4	14	22
Interest in forest conservation.....	6	1	0	2	4	13
Interest in natural sciences.....	1	1	1	0	1	4
Total usable answers.....	36	15	21	14	22	108

In designating their preferred specialties in Government forestry work the 130 men who replied definitely on this point indicated a wide range of taste. National forest administration showed a good lead over other

types of work, forest surveying and research tying for second place. The 130 answers on this point classify as follows:

	Per cent
National forest administration.....	23
Forest surveys.....	15
Research.....	15
Timber management.....	13
Public relations.....	8
Recreational engineering.....	6
Engineering.....	6
Range management.....	5
Planting.....	5
Improvement construction.....	4
Total.....	100

Woodlot improvement can sometimes be combined with white pine blister rust control, writes T. J. King, blister rust agent in New Hampshire. In examining a portion of a pine plantation at New London, N. H., in 1925 Mr. King found 75 per cent of the trees infected with the rust. He suggested to the owner that pruning might save many of the diseased trees, as well as bringing about general improvement of the plantation. On reexamining the plantation in 1928 he found that pruning had saved two-thirds of the infected trees. The trees that could not be saved were those on which the disease had reached the trunk.

Sixty years ago the father of Senator Henry W. Keyes was troubled with the blowing of sand from a certain part of his property at Haverhill, N. H., writes Blister Rust Control Agent T. L. Kane. In high winds, sand would be scattered all over the estate. To correct this state of affairs, in 1870 the elder Keyes planted the sandy lot with northern white pines brought from a near-by pasture. As a result sand piles are no longer seen on the drives and walks of the Keyes estate and the planted area of about 1 acre now has a stand of beautiful pines about 60 feet tall.

The city of Asheville, N. C., made a start this spring in planting unforested portions of its 15,000-acre watershed holdings. The moving spirit in this undertaking was Miss Jane Oakley, who was formerly a student of forestry at the University of Minnesota. In this first effort about 35 acres of badly burned spruce land was reforested. Miss Oakley supervised the planting and also paid the labor costs. Spruce planting stock was supplied by the Champion Fiber Co., truck transportation and drivers by the city. Ranger Wilson, of the Pisgah National Forest, organized the planting crew and camping arrangements.

Protecting Rustic Structures from Insect Damage

Log cabins and rustic bridges and furniture can easily be protected from insect damage, the Bureau of Entomology tells us. Reports have been received by the bureau of beetles riddling with holes the bark on such structures and articles, and of larvæ mining the inner bark and so causing the bark to fall off or boring into the heartwood and causing great damage.

Timber to be used for rustic structures or articles should preferably not be cut during the spring or summer months, the season when wood-boring insects are active. If cut at that season the trees should be treated immediately after cutting with a solution of 1 part of coal-tar creosote (grade 1 liquid oil) to 3 parts of kerosene. Before this mixture is used it should be strained through burlap. When diluted in this way creosote stains the wood very little. If treatment of the bark with creosote is objected to and the bark can readily be peeled, it is suggested that the bark be removed from the tree in strips, the wood treated with the creosote and kerosene mixture, and the bark replaced and fastened with large-headed nails. Where it is not especially desired to retain the bark the trees may be felled at any time of year, although preferably in the fall, the bark removed, and the logs brushed with creosote, which will give them a pleasing stain.

If the trees are cut in the late fall or in the winter, the logs should be placed in open piles, either off the ground or under cover, in such a manner as to offer the best facilities for the rapid and thorough drying of the inner bark. Logs thus treated will be safe from the attack of most kinds of insects. For additional protection, the logs should be sprayed in the following spring.

When rustic structures and rustic furniture are attacked by insects the bureau recommends treating all parts of the bark and wood with liquid orthodihlorobenzene. This solution is colorless and will not stain. Its slight odor disappears after a short time.

Great care must be taken to apply the liquid thoroughly, in order that it may penetrate deeply enough to kill the beetles and larvæ. Either a brush or a forceful sprayer may be used to apply the liquid. The spraying method is preferable because it requires less time and labor. One pint of the preparation will treat a rustic chair, and 3 gallons is sufficient to treat 100 square feet of log surface.

In most instances the presence of the wood borers can be detected by the piles of reddish-brown or whitish particles of boring dust which the insects push to the outside in order to clear their galleries.



More Territory Covered by Woodgate Rust Quarantine Regulations

The quarantine regulations on account of the Woodgate rust have been amended to include Madison County, N. Y.

Two Asiatic beetles related to the Japanese beetle are the subject of a quarantine promulgated by the Secretary of Agriculture on March 2. The area quarantined is coterminous with that now covered under the Japanese beetle quarantine. The regulations are in general of the same nature as those promulgated on account of the Japanese beetle, but unlike them do not control farm products. The two beetles concerned in this quarantine, *Anomala orientalis* and *Aserica castanea*, are important largely because of their capacity to injure and destroy lawns and grasslands.



Sound white oak posts placed in the ground green and unpeeled will last from 25 to 40 years in the Southwestern States, according to observations of W. H. Long, forest pathologist of the Bureau of Plant Industry. Small knot holes and cat faces in or near the ground shorten the life of the posts to from 15 to 20 years.

Foreign Notes

The Forests and Forestry of Suomi (Finland)

(From a booklet of that title by N. A. HILDÉN, Forest Research Institute Helsinki)

Suomi, Finland, is above all a country of lakes and forests. From the farthest forest outposts among the arctic mountains of Lapland right down to the shores of the Baltic, forest covers the whole country uninteruptedly.

The greater part of Finland belongs to the so-called northern pine forest climate. In the southern parts of the country there are milder regions in which the oak thrives, but in the extreme north the polar timber line runs through the territory of Finland.

Superficial deposit formed in the glacial period covers the ground almost everywhere in Finland, giving it a slightly hilly, undulating appearance. Mountain slopes and rocks rise into view only here and there. In North Finland, however, the landscape often takes its character from the arctic mountains, which sometimes raise their treeless tops to a height of more than 1,000 meters.

Of the land area of Finland, 34,359,900 hectares altogether, 73.5 per cent is forest land. Waste land composes 14.7 per cent. Among the countries of Europe Finland is the most richly wooded from the point of view of proportion of area forested, and stands second as regards total wooded area. There are in Finland 7.4 hectares of forest per capita, which is a

considerably higher proportion than that of any other European country.

The land is much less fertile in divide regions than on the shores of the watercourses and on the coast. In the latter regions forest growth is comparatively rapid in contrast to that in the divide regions and particularly to that on the icy shores of the Arctic Ocean.

On account of the comparative flatness of the country and because of the climate, the forest lands of Finland have tended to become swampy. Forest lands that have become swampy are estimated to compose 90 per cent of the peat bogs which occupy no less than 35.7 per cent of the country's land area. On most of the peat bogs some kind of natural forest grows, but about one-fifth of them is quite bare.

The country's most important species of trees are pine (*Pinus silvestris*) and spruce (*Picea excelsa*). Throughout the greater part of the country pine forests are most common. Spruce usually grows in the most fertile districts. In parts of North Finland spruce grows as the one prevailing tree.

Deciduous trees are less important than the conifers, although birch (*Betula verrucosa* and *B. odorata*) forms extensive pure forests beyond the northern limits of coniferous stands. In the southern parts of the country birch appears nowadays mostly on grounds that have been burnt for cropping purposes, or where a forest fire has occurred. The same can be said of aspen (*Populus tremula*) and alder (*Alnus incana*). Many other deciduous trees are present in the forests but are not of any great economic importance.

As a rule the forests in north Finland are old and even overmature; those in the South are mostly middle-aged or young. The average rotation during which trees come to maturity is considered to be 70-90 years in south Finland, but at least twice that long in the north.

The growing stock, including bark, amounts in all to 1,620,000,000 cubic meters. The annual increment of the forests, not counting bark, is 44,400,000 cubic meters. It is estimated that pine makes up 48 per cent of the growing stock, spruce 29.6 per cent, and birch 19.7 per cent, and that the annual increment is 44.4 per cent pine, 27.6 per cent spruce, and 23.2 per cent birch.

In comparison with conditions prevailing in Central Europe, for instance, the natural reproduction of forests proceeds quite successfully in Finland. Although the forests of the country have been dealt with in anything but a tender way for centuries past—they have been destroyed by forest fires, burnt for cropping purposes, and damaged by irrational cuttings—there are comparatively few open spaces. It has sometimes happened that a tree species less valuable from an economic point of view, alder for instance, has become predominant; on the other hand, it is on burned

grounds that the most beautiful and valuable forests of the country have sprung up. In most cases it is safe to depend on reforestation by means of natural seeding, if favorable conditions are provided by cuttings and other measures. It is due to natural seeding that mixed forests are very general. Mixed forests composed of coniferous trees and birch, in particular, occur frequently. The white birch trunks give the Finnish forest landscape what is perhaps its most characteristic feature, creating variety and beauty in the dark pine and fir forest.

The area, growing stock, and annual increment of the forests of Finland are distributed among the different ownership classes as follows:

	Land area		Growing stock		Annual increment	
	Thousands of hectares	Per cent	Millions of cubic meters	Per cent	Millions of cubic meters	Per cent
State.....	13,634.9	39.7	603	37.2	9.50	21.4
Private.....	17,908.0	52.1	820	50.6	29.00	65.3
Joint stock companies.....	2,217.0	6.5	157	9.7	4.79	10.8
Communes, etc.....	600.0	1.7	40	2.5	1.11	2.5
Total.....	34,359.9	100.0	1,620	100.0	44.40	100.0

State forestry activities are managed by a board of forestry subordinated to the Ministry of Agriculture. The State forests are divided into four districts, comprising in all 90 supervisor areas. The management of a supervisor area is entrusted to a supervisor assisted by assistant foresters, foremen, and rangers. Large trees for sawing purposes are usually sold standing, the buyer arranging for the felling. Smaller timber has to an ever increasing degree been delivered by the forest administration ready for sale at some suitable point of transport. The board of forestry also carries out a good deal of sawing in its own sawmills.

The smaller annual increment on the State forests as compared with private lands is due to the fact that the State forests are situated largely in the barren divide regions in the northern part of the country, and to the comparatively great average age of the State-owned timber. The State forests supply a considerable portion of the raw material requirements of the Finnish wood manufacturing industry, and constitute one of the most important sources of wealth and income of the Finnish State.

The private forests are divided among hundreds of thousands of owners. Owing to the cold climate and to the fact that there are no coal mines in Finland, such quantities of timber are required for building and heating purposes that agriculture would be unprofitable if it were not combined with forestry.

The forest law now in force prohibits the cutting of old forest unless provision is made for satisfactory

regeneration, and prohibits any cutting of young forest other than rational thinning. The control of the observance of the law is entrusted to 18 forest conservation boards, to whom forest owners are obliged to report all fellings for sale.

Another important function of the forest conservation boards is to work for silvicultural improvement of the private forests, as by providing the forest owners with competent and cheap professional service and by rendering financial aid in forest management, particularly to small farmers. The boards also distribute among private individuals the considerable contributions and loans which the State has recently granted for draining peat bogs suitable for forest cultivation. Although established by law and receiving considerable State support, the boards base their activities essentially upon the voluntary efforts of the forest owners.

The lands in joint stock company ownership belong mostly to wood-manufacturing establishments that have acquired the lands to assure themselves of a supply of raw material. The forests of these companies are, as a rule, better managed than private forests.

The species of trees growing in the forests of Finland yield first-class timber material which, in manufactured shape, is in great demand in foreign markets. Finnish timber is very well known for its strength and durability, due to its comparatively slow growth. Further, timber transport facilities are favorable in Finland. There is a moderate fall of snow in the winter, when the felling and hauling of trees can be carried out even under difficult topographical conditions. During the winter timber is hauled by horses to the banks of innumerable rivers, streams, and lakes. At the breaking up of the ice in the spring the watercourses are everywhere ready to take over the transport of timber. For hundreds of kilometers the logs pass over roaring rapids, across blue lakes, and down powerful streams to the wood mills. These are usually situated along the coasts, principally at those places where large watercourses empty themselves into the sea. The continually extended network of railways completes the transport facilities offered by nature.

In 1927 the wood-manufacturing and paper industries employed no less than 47 per cent of all the industrial workers of Finland, and their productive output represented 46 per cent of the value of the whole industrial production of the country.

In general, the larger pines and spruces are converted by the sawmills into deals, boards, etc., while smaller spruces and the tops of the coniferous trees, as well as the coarse waste obtained in sawing, are made into pulp and paper. Birch is turned into plywood and spools, and aspen is sent to match factories. All kinds of less valuable trees, as well as mill waste, are used by the mills as one of the most important forms of fuel. The State railways are run mainly on firewood.

The value of forest products exported by Finland last year made up from 80 to 90 per cent of the total value of the country's exports. The quantities exported were as follows:

Sawn goods	standards	1, 146, 500
Round timber	cubic meters	3, 876, 800
Plywood	tons	82, 882
Spools	do	5, 559
Paper	do	243, 807
Chemical pulp	do	473, 023
Mechanical pulp	do	182, 965

England is the largest buyer of Finnish timber. Holland, Belgium, Germany, and France all buy considerable quantities. Many tens of thousands of standards are sent annually to Spain, Denmark, and South Africa. Buyers of Finnish paper products include, together with these countries, Russia, the United States, South America, and China.

The Swiss National Park

(From an article by G. D. KITCHINGMAN, Indian Forest Service, in the Quarterly Journal of Forestry [London])

In the Engadine, the Alpine valley that the Swiss call "the Roof of Europe," Switzerland has a national park of 35,500 acres. Some 30 years ago Swiss naturalists, alarmed by the way in which the spread of railways and industries was threatening the beauties of their country, organized a society for the protection of nature and became active in persuading local bodies to frame rules to protect wild flowers and certain small areas. Soon they began to work toward the reservation of the Scarl Valley, which lies in the Engadine some 15 miles east of St. Moritz. By 1913 the society's membership had grown to 24,000, a remarkable number for so small a country. Still private subscriptions were not sufficient, for the area of reservation contemplated had spread to cover the whole of the present park. In 1914 the Swiss Government agreed to pay an annual subsidy of 30,000 francs toward the expenses and a 99-year lease was drawn up with the communes concerned. The park is now controlled by a commission to which members are appointed both by the Government and by the society. The society is responsible for carrying out definite research work and issuing an annual report. All plant and animal life is protected and no commercial use of timber or forage is permitted.

Lying in the southeast corner of Switzerland between the River Inn and the Italian border, this park is the meeting place of the flora of the western and that of the eastern Alps. The climate is comparatively dry, with an average annual rainfall of less than 28 inches. Winds from the southwest generally reach the Engadine as desiccating winds, having dropped most of their moisture in the French Alps. The park lies between altitudes of 4,500 feet and 10,400 feet. Its valleys are

not deeply cut. On a high-lying plateau of this kind the variation between the mean summer and winter temperatures is bound to be great on account of the increased insolation in summer and the intense radiation in winter. This southeast corner of Switzerland is mostly Triassic Dolomite. The jagged tooth-like peaks into which dolomite (magnesium limestone) weathers, with masses of débris on their slopes, together with the results of a thrust from the southeast in the Tertiary period that folded parts of the country like a tiled roof, give the mountains a wild character unusual in Europe.

All the important tree species of Switzerland can be seen in this park except the yew, for which it is too high, and the silver fir, for which it is too dry. The "mountain" zone of vegetation, characterized in Central Europe by mists and fogs and heavy fir forest, is not found in the park. The next higher zone, the "subalpine," which generally starts at an elevation of more than 5,000 feet, is well represented. A subalpine zone indicates much drier conditions than a mountain zone, for it lies above the line of mists and fogs. Strong insolation by day, low temperatures (especially of the soil) at night, and frequent strong drying winds produce a habitat distinctly xerophytic (suited for plants having low moisture requirements). In this park the scarcity of moisture is intensified by the prevalence of the dolomite, which like all limestones produces a poor, thin soil.

The chief trees of this zone are *Pinus silvestris* and its local variety *Engadinensis*, *Pinus montana*, spruce, larch, and the arolla pine. *Pinus silvestris* does not grow above 5,000 feet. This is said to be due to the fact that its tapering root can not get a hold on rocky ground. It does not like drought, but is indifferent to the composition of the soil. It is found nearly always in mixture with the larch, spruce, or mountain pine. The variety *Engadinensis* is more abundant in the park than the typical species, for with its more slender crown it can better resist snowbreak. It is to be distinguished by its thinner and less jagged bark and its cones, which are fixed horizontally. *Pinus montana*, which is more xerophytic than *P. silvestris*, grows up to 6,000 feet. It can thrive on the dry barren limestone soil and often on rocky slopes, and is resistant to wind and frost. It is a pioneer species and very long lived, and is here characteristic of dolomite soil. Spruce is common in the park, and forms characteristically dense silent jungles. It does not grow much above 5,000 feet. As a rule it prefers well-drained slopes facing west, avoiding dry locations. The larch, the most beautiful tree of the Engadine, is well represented. Being deciduous, it can withstand the drier conditions and the damage from snow and is consequently well adapted for the subalpine zone.

Most interesting of the trees in the park is the arolla pine (*Pinus cembra*), which is called "the cedar of the

Alps" and grows up to about 5,700 feet. Typical of the granite and gneiss soils, it forms only open forest, generally with an undergrowth of rhododendron. The isolated trees toward the higher limits of the species are stern, robust, majestic specimens, torn, twisted, and bent by the severity of the winds. This pine is often found in mixture with the larch, and, like it, is a pioneer species at these higher elevations.

Advancing from the subalpine to the alpine zone, we leave the forest to enter the high-lying pastures. Here we are amongst the vivid alpine flowers. As regards pasture grasses, it seems that with the decrease in grazing their condition is deteriorating and inferior grasses are getting a hold. Above the alpine zone come the "débris" and "rock" zones, with their scanty yet distinctive vegetation; and then the line of permanent snow, which in the park is at about 6,400 feet.

The Middle Ages saw the reindeer, elk, bison, and wild ox disappear in Switzerland. The ibex, which is the favorite emblem on the coats-of-arms of many Engadine families, followed in the beginning of the nineteenth century. By the end of that century the beaver, wild boar, bear, lynx, wolf, and lammergeier had become extinct. The last bear in Switzerland was killed about 1900. Under protective measures enforced by the park commission good increases have been made in the park by the red and roe deer, the snow partridge, and the capercaillie. An increase has been shown also in the number of chamois, which in 1927 stood at 1,512. Eight ibex brought from Italy, where a herd of more than 2,000 is kept in the royal Grand Paradis reserve, were introduced into the park in 1923 and by 1927 had increased to 17.

Plant Life of the Balkan Peninsula

In reviewing *The Plant-Life of the Balkan Peninsula*, by W. B. Turill, which has appeared as the first of a series of Oxford memoirs of plant geography, the editor of the *Quarterly Journal of Forestry* (London) has written as follows:

The Balkan Peninsula contains more native species of plants than any other part of Europe of the same area. It lies at the junction of three continents and has drawn its floral, as well as its human, population from many sources. Also, it was less affected by the ice age than other parts of Europe, and it still preserves many of its Tertiary species; and as it has a very varied climate and high mountain ranges it can find space for many types of ecological formations.

The climate is of especial interest. The southern part of the peninsula is governed by Mediterranean conditions and has such a dry summer that at some meteorological stations the rainfall from June to September is considerably less than 1 inch. This drought is accompanied by high temperatures, and summer, rather than winter, is the rest period of the vegetation. The more northern and eastern parts have a Central European climate, with more or less evenly distributed rainfall and a very cold winter.

Nearly the whole of the peninsula was at one time covered by forest, but in the course of centuries the greater part of this has been destroyed by fire, grazing, lumbering, and cultivation. The climate is so near the limit for forest growth that regeneration does not occur freely, and the removal of litter and extensive goat grazing have left the forest no chance of holding its own. This has resulted in loss of soil, and much land that was once forested is now covered by very xerophytic shrub growth or is reduced to rock with plants only in the crevices. The Mediterranean flora, including some of the most cherished shrubs of our gardens, has advanced very considerably since the "dawn of civilization."

The forests that are left show an interesting zoning with regard to altitude. Under the Mediterranean climate *Pinus halepensis* and *P. pinea* are dominant up to 1,000 feet, where they give place to evergreen, or leathery-leaved, oaks. At 2,000 feet deciduous oaks occur, together with ash, sweet chestnut, etc., and above these is a second coniferous zone, generally dominated by *Abies cephalonica*. Under the Central European climate deciduous trees form the forest up to 5,000 feet, with many species of deciduous oaks in the lower levels and ash and beech higher up. This is succeeded above about 5,000 feet by a coniferous zone, including *Picea omorika* (a Tertiary relict), *Pinus silvestris*, *Picea excelsa*, and *Abies pectinata*. *Pinus peuce* also occurs in this region.

Forest Conservation in Sao Paulo, Brazil

(Based on text of regulations in Diario Oficial do Estado de Sao Paulo
October 3, 1928)

Regulations promulgated in 1928 outlining the organization and functions of the State Forest Service of Sao Paulo contain among other provisions the following:

The owner of 100 hectares or more of land must keep at least 10 per cent of it in forest. He may clear-cut the whole area, but if 10 per cent of the area does not immediately restock by natural reproduction he must plant that much of it. The owner of 100 hectares or more of bare land is required to reforest 10 per cent of it within 5 years unless he is granted an extension by the secretary of agriculture. Before clearing land an owner must give 30 days' notice to the district office of the forest service.

Each of the five district offices is to maintain a nursery, from which a limited number of plants will be furnished to landowners free or at cost. Each district is also to establish a forestry museum showing the forest possibilities of the district by means of maps and charts and of exhibits of woods and articles made from them, forestry methods and tools, etc. The central office at Sao Paulo is to maintain a more elaborate museum for the entire State.

The forest service is to carry on propaganda work in favor of forest fire prevention and is to enforce the fire laws. These provide that before setting fire on cut-over or other land a landowner must clear a fire line

6 meters wide around it and warn his neighbors of his intention to burn. He must also have an effective control force on duty while the fire is burning. Brush burning is permitted only during June, July, August, and September. The sale and use of fire balloons is prohibited.

One of the important forest protective duties of the forest service is the extermination of ant hills. (In Brazil ants are among the worst enemies of forests.) Each forest district is required to maintain a corps of skilled ant "matadores" whose duty it is to destroy ant hills on public and private lands. Every owner is obliged to destroy any ant hills on his land that threaten damage to the property of others, and if he fails to do so the forest service will do it, charging him the cost plus 20 per cent. The forest service is to furnish ant-killing tools and chemicals either free or at cost.

Forest Law of Guatemala

The forest law adopted by Guatemala in 1925 provides for Government control (regimen forestal) over all forest land belonging to the nation, to municipalities, and to corporations or individuals who request such control. Privately owned forest protecting the sources of streams or water supplies is under public regulation. The law forbids the clearing of either public or private forests within 100 meters of a ridge crest, or on slopes where clearing will endanger life or property below. Commercial timberlands belonging to the State are declared reserves, and can be alienated only by special act of the legislature. Even when they are thus alienated, 10 per cent of the area must be kept in forest. All municipalities are required to set aside a portion of their land as forest reserves; if they have no land in forest they must reserve bare land and afforest it.

The department of agriculture is to make maps and working plans for all forest lands under public control, and has charge of concessions for cutting timber or extracting other products. Cutting concessions must provide for planting three young trees of specified species for each one cut. (In the coffee and pine belts, over 3,000 feet altitude, five trees must be planted if not of the same species as the one cut). Planting must be done at the beginning of the rainy season in the same year as the cutting, and in case of failure must be repeated. The time of cutting is to be fixed by the department, and no immature trees may be cut, nor may trees be felled in order to extract gum or resin. Concessions are to be granted only after public bidding following 3 months' advertisement, and run for 3 years unless costly machinery is required, in which case 5 years is the limit. Renewals for like terms are permitted as long as the concessionaire is willing to pay as much as any other bidder. The size of concessions is limited on the basis of area or number of trees.

The department is directed, after suitable studies, to undertake the reforestation of bare land where forest destruction threatens the stability of the soil or the flow of streams. Nurseries and demonstration plantations are to be established in each forest region. Bare land reforested by private owners is exempt from taxes for five years, and owners are to be exempt from certain obligations as to military service in proportion to the number of trees planted.

The last Sunday in May is designated as Arbor Day, to be observed by municipalities and all schools.

Private owners may burn over their own land only after taking due precautions and warning the local alcalde and their neighbors 24 hours in advance. Burning on windy days is forbidden. On State forests, burning is prohibited except where it may for various reasons be deemed necessary, and then it is allowed only after a fire line 20 meters wide has been cut and every dry snag and bush within 100 meters has been cut.

Two peons equipped with axes, shovels, etc., must be kept on guard for every 100 meters of line, and four where the slopes are steep.



Exceptionally cold weather experienced during the past winter in Belgium resulted quite commonly in the killing of planted Douglas fir. Heavy damage occurred in plantations established with seed obtained in the Pacific coast region of the United States, especially in those from seed originating in the Northwest; plantations believed to have been established with seed from the Rocky Mountain region survived. Plantations of *Sequoia sempervirens* suffered, showing much less frost resistance than plantations of *S. washingtoniana*.



Forty-five township forests aggregating 411,765 acres have been established in Quebec under the control of the provincial forest service.

Personals

Harold S. Newins, professor of wood utilization in the Pennsylvania State College, has accepted appointment to the newly created position of chief forester of West Virginia. Following his graduation from the Yale Forest School in 1911, Mr. Newins worked on a national forest, in a lumber mill, and as a demonstrator of dry kiln operation. He inspected aircraft woods for the Government during the war, taught forestry in the Oregon Agricultural College, and was eastern manager of the dry-kiln department of the Cutler Desk Co. for two years before joining the faculty of the Pennsylvania college in 1924.

W. G. Wahlenberg has resigned from the United States Forest Service, after many years' work in forest research at the Northern Rocky Mountain Forest Experiment Station and the Southern Forest Experiment Station, to accept a position with the Eddy Tree Breeding Station, Placerville, Calif. Mr. Wahlenberg has specialized extensively in nursery practice.

Nicholas T. Mirov has accepted appointment as assistant silviculturist, Southern Forest Experiment Station. He will be assigned to naval stores work at Starke, Fla. Mr. Mirov is a graduate of the Russian Imperial Forest School and has had wide experience in Russia, in China, and in California.

F. M. Callward has resigned as extension forester of Vermont to accept a forestry position with St. Lawrence University. His new work will include both teaching and extension activities.

Roy L. Hogue has resigned as State forester of Mississippi, his resignation taking effect June 1.

Frank E. Bonner, for the past six and one-half years district engineer of the California National Forest District, has accepted appointment as executive secretary of the Federal Power Commission, succeeding O. C. Merrill. Mr. Bonner's membership in the United States Forest Service dates from 1909. His first assignment was in the Northern National Forest District, with headquarters at Missoula, Mont. For a number of years he was assistant engineer in the Washington, D. C., office of the service, and for a short period he was stationed at the Forest Products Laboratory. He is succeeded by E. W. Kramer, hydroelectric engineer of the California National Forest District.

William K. Williams, jr., has accepted appointment to the position of extension forester in the Office of Cooperative Extension Work, United States Department of Agriculture. For more than two years Mr. Williams has been extension forester for Arkansas. Prior to that service he was for four years forester for the Crossett Lumber Co., Crossett, Ark. He is a graduate of the Yale Forest School, and as a result of winning an honor scholarship had a year of forestry study in Sweden.

James B. Ellis, Dallas County, Ala., has been elected to membership on the Alabama Commission of Forestry, filling the vacancy caused by the death of J. Lee Long.

Fred Cronemiller has been promoted to the supervision of the Modoc National Forest, Calif., left vacant by the death of George W. Lyons. Mr. Cronemiller leaves the position of associate range examiner in the California National Forest District.

Members recently appointed to the Appalachian Forest Research Advisory Council for a 3-year term are J. P. Hummel, Hummel-Ross Fiber Corporation, Hopewell, Va.; George Curtin, Pardee & Curtin Lumber Co., Clarksburg, W. Va.; and H. L. Tilghman, Tilghman Lumber Co., Marion, S. C.

Reuben W. Smith, who for the past year has been connected with the National Lumber Manufacturers Association, has accepted a position as field engineer with the California Redwood Association.

Arthur T. Upson has been promoted by the National Lumber Manufacturers Association from the position of eastern divisional manager to that of assistant trade extension manager. In his new position he will direct the association's division of lumber standards and specifications and will be charged with the promotion of its grade-marking and trade-marking program. Mr. Upson's connection with the Lumber Manufacturers Association, which dates from 1924, was preceded by 10 years' experience as a national forest officer and 4 as an executive of the Forest Products Laboratory.

S. V. Fullaway, jr., who left the United States Forest Service in 1927 to take charge of the Portland, Oreg., office of the National Lumber Manufacturers Association, has accepted the secretary-managership of the Western Pine Manufacturers Association, left vacant by the resignation of A. W. Cooper.

B. E. White has been appointed to a position with the Extension Service of Oklahoma that includes half-time duty as extension forester. Mr. White received the B. S. degree in botany from the University of Arkansas and has had experience as a county agent. He will be stationed at Stillwater, Okla.

W. E. Bond has taken charge of the division of forest protection of the Texas Forest Service, recently left vacant by the resignation of H. J. Eberly. C. B. Webster has succeeded Mr. Bond as chief of the division of forest management in the same organization, and Mr. Webster's former post as Texas farm forester has been accepted by C. W. Simmons. Mr. Simmons comes to the extension position from the United States Forest Service, after several years' experience on the national forests of Arizona and New Mexico.

Earl T. Barron has been assigned to the staff of the State forester of California as inspector at large to assist in the supervision of the State fire control organization. Mr. Barron has been a member of the California forestry organization for several years. He leaves the position of regional inspector in the Mother Lode district.

Edward N. Munns, Chief of the Office of Forest Experiment Stations, Joseph Kittredge, jr., silviculturist of the Lake States Forest Experiment Station, and A. J. Stamm, chemist of the Forest Products Laboratory, have been designated to represent the United States Forest Service at the seventh congress of the International Union of Forest Experiment Stations in Stockholm, Sweden, July 22-27. After the meeting the Forest Service representatives will make a study of forest research in Sweden and in several other European countries.

P. R. Gast, of the Harvard Forest and the Northeastern Forest Experiment Station, has been appointed to a National Research fellowship and is sailing in July for Sweden, where he expects to study for a year under Heinrich Hesselman, director of the Swedish Forest Experiment Station at Stockholm. Doctor Gast will specialize in forest soils, with particular reference to nitrogen relations.

A. B. Hatch, junior forester at the Allegheny Forest Experiment Station, has been awarded a Scandinavian-American fellowship for 1929-30. He will study at the Swedish School of Forestry, Stockholm, under Doctor Melin, his particular study being the rôle of mycorrhiza in relation to tree growth.

John T. Auten, who has for several years been teaching forest soil science and chemistry at the Pennsylvania State Forest School, is joining the staff of the Central States Forest Experiment Station. As a member of the United States Forest Service, Doctor Auten will continue his studies of forest soils.

H. L. Shirley has been appointed associate silviculturist at the Lake States Forest Experiment Station, effective August 1. Doctor Shirley received the doctor's degree from the Yale Forest School, at which he specialized in the relationship of light to the growth of forest species. For the past year he has been associated with the Boyce Thompson Institute for Plant Research.

J. Frank Sharpe has been appointed forester in charge of provincial forests of Ontario, under the act providing for the establishment of eight provincial forests in different parts of the Province with a total area of about 25,000 square miles. Mr. Sharpe has been connected with the Ontario Department of Lands and Forests ever since his graduation from the University of Toronto seven years ago, having charge of the estimates and surveys branch during the greater part of that period.

Ray C. Steele, game protector of the Bureau of Biological Survey, with headquarters at Portland, Oreg., has been designated to succeed William T. Cox, head of the new forest service of Brazil, as superintendent of the Upper Mississippi River Wild Life and Fish Refuge.

K. J. Seigworth has been appointed district forester on the Eastern Shore of Maryland to succeed A. A. Doppel, now with the United States Chamber of Commerce. Mr. Seigworth is a forestry graduate of the Pennsylvania State College and has had two years' experience in private employ in the South.

William Maughan, one of this year's graduates of the Yale Forest School, has been appointed assistant in applied forestry in the school for the year 1929-30. Before entering Yale Mr. Maughan was an instructor in forest engineering at the New York State College of Forestry.

H. H. Chapman, professor of forest management in the Yale Forest School, has been appointed president of the Connecticut Commission on Forests and Wild Life, to succeed Hon. Frederick C. Walcott, newly elected United States Senator.

C. Cyril Klein, recently nursery superintendent with the Maryland Department of Forestry, is now city forester and superintendent of parks for the city of Frederick, Md. In this position he has charge of 7,000 acres of forest owned by the city, as well as of the city park system and street trees. Concurrently, he is to hold the position of assistant district forester in charge of the Catoctin-South Mountain section, supervising the fire-control work throughout that territory.

Hugo L. Sundling, who earned a master's degree in forestry at Pennsylvania State College during the past school year while on leave of absence from the Allegheny Forest Experiment Station, is returning to Federal forestry work as a member of the staff of the California Forest Experiment Station. He will work with W. C. Lowdermilk on studies of erosion and run-off.

Bibliography

German Journal of Forestry Abstracts

A quarterly journal of forestry abstracts is being published by the J. Neumann Press, of Berlin, under the title *Forstliche Rundschau*, the first number having appeared in October, 1928. This is a continuation of *Forstliche Jahresberichte*, published for 40 years at Frankfurt and Tübingen. The journal is international in scope. Its purpose is to give at all times an accurate résumé of forestry progress and achievement. Professor Weber, of Freiburg, is editor in chief, with collaborators in various countries. The American collaborator is Prof. A. B. Recknagel, New York State College of Forestry. Inquiries in regard to the journal may be addressed to Professor Recknagel, or to J. Neumann, Anhaltstrasse 7, Berlin SW 11.

New Canadian Woodlands Monthly

The woodlands section of the *Pulp and Paper Magazine of Canada*, heretofore published as a monthly supplement of 16 pages, has expanded into a monthly magazine of 36 pages entitled "Canadian Woodlands Review." In its first number, which appeared as that of May, 1929, the new magazine stated that it "is not for the general public nor for the man with rod and gun, but is for the forest engineer, the woods manager, and all who are interested in our Canadian tree-growing areas from a financial, industrial, and professional aspect." J. N. Stephenson, the editor, announces that Norman MacKinnon, a forestry graduate of Aberdeen University experienced in Canadian woods operations and forestry work, has joined the publisher's editorial staff and will devote his efforts principally to

the *Woodlands Review*. The publisher is National Business Publications (Ltd.), the Garden City Press, Toronto, Ontario, and Gardenvale, Quebec.

Maine to Publish Helpful Manual of Forest Insects

Henry B. Peirson, who becomes State entomologist of Maine on July 12 of this year, after serving the State for eight years as forest entomologist, has ready for the press a new pocket manual to be used by field men in reporting insect attacks on forest trees. All phases in the life histories of the forest insects that are important in the State are shown by a single page of illustrations, the pictures for each of the individual species forming a strip across the page. This gives the field man an easy way to get acquainted with the different forms and to associate these forms with each other. Instructions, simple and nontechnical but complete, are given for reporting an insect attack. An index enables the field man unacquainted with entomology to begin with the species of tree which he finds being attacked and look up the kinds of insects likely to be responsible. The manual contains in small compass an immense amount of practical information. It will be distributed to all field men in the State service, including the 600 fire wardens. The field men have orders to report to Doctor Peirson any insect outbreak they may observe, and are to be instructed in the detection of insect outbreaks by R. W. Nash, one of this year's graduates of the Massachusetts Agricultural College.

Any inquiry about this manual should be addressed to Dr. Henry B. Peirson, Statehouse, Augusta, Me.

Age Can Not Wither A Good Book

By WALTER P. TAYLOR, United States Bureau of Biological Survey

A book first published in 1864 that retains the utmost interest and significance today is George Perkins Marsh's *The Earth as Modified by Human Action*. The author of this work was born at Woodstock, Vt., in 1801. He was admitted to the bar in 1825, entered Congress in 1843, was appointed United States minister to Turkey in 1849, subsequently served as fish commissioner and then railway commissioner of Vermont, and from 1861 until his death in 1882 was United States minister to Italy. Known as a philologist and as "the patriarch of American diplomacy," he was also an outstanding patron of the sciences. He was both a friend and a powerful supporter of Spencer F. Baird, famous secretary of the Smithsonian Institution.

Together with personal observations of a long lifetime that included wide travels, there went into this book the results of voluminous reading. In the original 1864 edition, which appeared under the title *Man and Nature*, the 63-year-old author's list of the works consulted in the preparation of the volume included 210 titles, representing English, French, German, Italian, Dutch, Scandinavian, and Latin literature. When the book reappeared under its new title in 1874, this list of references had expanded to 363 titles. A third edition was copyrighted in 1884 and appeared in 1885.

An almost prophetic insight enabled Marsh to anticipate many of the conclusions to which we of a later day are being forced in regard to deforestation, erosion, and the results of man's disturbance of the biological balance of nature. It was his belief that "every plant, every animal, is a geographical agency, man generally a destructive; vegetables, and in some cases even wild beasts, restorative powers" (p. 55¹). He believed also that "all nature is linked together by invisible bonds, and every organic creature, however low, however feeble, however dependent, is necessary to the well-being of some other among the myriad forms of life * * *" (p. 137). Ecological research affords a good deal of support for this view, although there is a vast difference in the importance of the rôles played by the various species in a given community.

All of us who have to do with any phase of wild-life or plant-life management may well ponder the principle stated by Marsh as follows: "As often as we destroy the balance by deranging the original proportions between different orders of spontaneous life, the law of self-preservation requires us to restore the equilibrium, by either directly returning the weight abstracted from one scale or removing a corresponding quantity from the other. In other words, destruction

must be either repaired by reproduction or compensated by new destruction in an opposite quarter" (p. 143). Failure to take full account of this principle has resulted on the one side in decrease or even extermination of valuable wild species and in elimination of rich resources in forage and forest lands; on the other side, in undue increase in weeds, insects, rodents, and game. Marsh's "law" cuts both ways. It puts the emphasis where it belongs, namely, on thinking through our management systems, so far as possible, to their ultimate consequences. In many instances much research is needed before we can anticipate the results of our acts.

Marsh gave considerably more attention to animal relations than has been the custom of many later writers on kindred subjects. One of the influences he mentions with appreciation is the effect of earthworms and small burrowing quadrupeds on the permeability of the soil (e. g., pp. 25, 128-129). He refers to the rôle of beavers in producing bogs and those of smaller animals, insects, and birds in destroying the woods (pp. 27-31, 131-132), but without expressing any apprehension of considerable or permanent change from these causes except, perhaps, in the case of insects. At one point he states that "Young trees in the native forest are sometimes girdled and killed by the smaller rodent quadrupeds, and their growth is checked by birds which feed on the terminal bud; but these animals, as we shall see, are generally found on the skirts of the wood only, not in its deeper recesses, and hence the mischief they do is not extensive" (p. 31). In the light of the work of later naturalists this statement doubtless requires modification, for it is ever clearer that under the increasingly disturbed conditions of the present day animals may do serious mischief to forest trees.

It was Marsh's opinion that even when they were most numerous the wild quadrupeds of North America were few compared with the "many millions of hoofed and horned cattle now fed by civilized man on the same continent." He strongly condemned the practice of grazing domestic animals in woodlands, asserting (p. 371) that "no growth of young trees is possible where horned cattle, sheep or goats, or even horses are permitted to pasture at any season of the year, though they are doubtless most destructive when trees are in leaf."

In one place (p. 21, footnote) our author says "The succession of crops, which occurs in all natural forests, seems to be due rather to changes of condition than of climate." This seems to indicate a foreshadowing of later ideas of ecologic succession.

Marsh was deeply impressed with the effects of deforestation on erosion. He quotes Charles de Ribbe (p. 243) to the effect that in the seventeenth century, in Upper Provence and in Dauphiny, France, the augmented violence of torrents following the clearing of

¹ Page references are to the 1874 edition. The publisher is Charles Scribner's Sons, New York.

the forests swept away or buried in sand and gravel more land than had been reclaimed by clearing, resulting in gradual abandonment of considerable tracts by the starving inhabitants.

In his chapter on The Woods, Marsh has an interesting section on the destruction of forests in France at the time of the French Revolution (pp. 339-344): "The general crusade against the forests, which accompanied that important event, is to be ascribed, in a considerable degree, to political resentments. * * * The Tiers État declared, in 1789, 'the most terrible scourge of agriculture is the abundance of wild game, a consequence of the privileges of the chase; the fields are wasted, the forests ruined, and the vines gnawed down to the roots.' * * * In the popular mind the forest was associated with all the abuses of feudalism, and the evils the peasantry had suffered from the legislation which protected both it and the game it sheltered, blinded them to the still greater physical mischiefs which its destruction was to entail upon them."

Marsh's book is valuable not only for itself but also as a key to many old French, Italian, German, and other works dealing with the same or related subjects.

New Wisconsin Tree Manual

A pocket manual on Forest Trees of Wisconsin has been published by the conservation commission of that State, the text having been prepared by Extension Forester F. G. Wilson with the cooperation of W. R. Mattoon, United States Forest Service. An introduction in which Mr. Wilson discusses in popular style the growth and reproduction of trees is followed by illustrated descriptions of 57 tree species. The text includes many interesting and helpful facts and suggestions not only for timberland owners but for campers, hunters, and others who go to the woods for recreation. The booklet is supplied by the Wisconsin Conservation Commission at a charge of 15 cents.

A Forestry Bulletin for Wisconsin Farmers

The Farm Timberlot, by F. G. Wilson, extension forester, Wisconsin College of Agriculture, presents in readable form the more important phases of the growing of timber as a farm crop in Wisconsin. Forestry is discussed as an integral and profitable part of farming making it possible for otherwise unproductive portions of the farm unit to pay their way and for farm labor to be utilized at odd intervals. One of the important advantages listed is that timber growing "produces a crop which is not perishable but can be left to grow if desired." Soil, moisture, and light requirements of different tree species, and the value of their wood for

given uses, are discussed. Specific directions are given for cutting to improve sapling and polewood stands and for rejuvenating heavily-grazed old stands. Other subjects treated are the undesirability of combining grazing with timber growing in the Wisconsin farm woodland, and methods of cutting and logging timber for fuel and other farm use. Helpful points are presented on the selling of farm timber.

This well-illustrated bulletin of 32 pages is published by the Agricultural Experiment Station, University of Wisconsin, Madison, Wis., and is available on request.

Long-Bell Co. Publishes Planting Manual for Farmers

Southern farmers are receiving as a gift from the Long-Bell Lumber Co. an attractive illustrated booklet entitled "The Farmers' Manual of Woodland Planting." A foreword states that "the Long-Bell Lumber Co. has noted with deep satisfaction the interest shown by farmers in reforestation in the regions where its forestry activities are going forward. In numerous instances its foresters have been asked to furnish information about tree planting and even to plant areas of non-agricultural land for the owners of farms. In view of the evident fact that such interest is growing everywhere in the South, it has been thought advisable to prepare a manual of woodland planting for the especial use of southern farmers." The remarks on the advisability of timber growing as a farm enterprise, the discussion of forest tree species recommended for growing on farms, and the suggestions as to methods of establishing, caring for, and harvesting the farm woodland are written in a direct, concise manner that assures the usefulness of the booklet.

Bulletin Tells Boys What They Can Make from Boxes

The first volume in a series of publications on practical uses for second-hand boxes and odd pieces of lumber has been issued by the National Committee on Wood Utilization under the title "You Can Make It." The bulletin is intended especially for the use of boys, and was prepared with the cooperation of the Boy Scouts of America, the Y. M. C. A., Junior Achievement (Inc.), and several other such organizations. It contains directions, with diagrams, for making more than 100 articles grouped as amusement devices and as equipment for the camp, for the garden, and for the home. Copies can be obtained at the price of 10 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Recent Books and Pamphlets

- Averell, J. L., and McGrew, P. C.: The reaction of swamp forests to drainage in northern Minnesota. 66 pp. illus., maps. Minnesota Department of Drainage and Waters, St. Paul, 1929.
- Bailey, I. W., and Spoehr, H. A.: The rôle of research in the development of forestry in North America. 118 pp. The Macmillan Co., New York, 1929.
- British Empire Forestry Conference: Third British Empire forestry conference, Australia and New Zealand, 1928: papers presented. 905 pp. illus., maps. Government Printer, Canberra, 1929.
- California State Park Commission: Report of State park survey of California, prepared by F. L. Olmsted. 72 pp. illus., map. Sacramento, 1929.
- Cline, A. C.: Forest weeding, with special reference to young natural stands in central New England. 20 pp. illus. Massachusetts Forestry Association, Boston, 1929.
- Detwiler, S. B.: Insect and disease control as a branch of forest protection. 28 pp. Yale Forest School, New Haven, 1929.
- Michigan Department of Conservation: Fourth biennial report, 1927-28. 304 pp. illus., maps. Lansing, 1929.
- New Hampshire Forestry Commission: Biennial report for the two fiscal years ending June 30, 1928. 235 pp. illus. Concord, 1928.
- Tennessee Division of Forestry: Report of the State forester from December 1, 1926, to November 30, 1928. 38 pp. illus., map. (Bulletin No. 4.) Nashville, 1928.
- United States Department of Agriculture: Relation of forestry to the control of floods in the Mississippi Valley. 740 pp. illus., maps. (70th Cong., 2d sess., H. D. No. 573.) Washington, D. C., 1929.
- Washington Department of Conservation and Development: Fourth biennial report, from October 1, 1926, to September 3, 1928. 75 pp. map. Olympia, 1928.
- Wisconsin Legislature Interim Committee on Forestry and Public Lands: Report to the Wisconsin Legislature of 1929. 46 pp. Madison, 1929.
- Yugoslavia, Ministère des Forêts et des Mines: Le Karst Yougoslave. 155 pp. illus., maps. Zagreb, 1928.
- Zon, R., and Scholz, H. F.: How fast do northern hardwoods grow? 34 pp. illus. (Wisconsin Agricultural Experiment Station Research Bulletin 88.) Madison, 1929.

Articles in Periodicals

- Journal of Forestry, February, 1929.—Denuded versus restocked lands for acquisition, by P. W. Ayres, pp. 119-124; Denuded versus restocked lands for acquisition, by E. A. Sherman, pp. 125-128. March, 1929.—The decay of hardwood slash in northern New England, by P. Spaulding, pp. 241-245; Results of thinning jack pine, by T. S. Schantz and R. M. Brown, pp. 275-279.
- Naval Stores Review, May 11, 1929.—What the microscope reveals as to effects of turpentine on the pines, by E. Gerry, pp. 14-15. June 1, 1929, Studies on flow of gum in relation to profit in naval stores industry, by A. Cary, pp. 14-16.
- Pacific Pulp and Paper Industry, March, 1929.—The paper industry in the lands of the Soviet, by K. H. Grayson, pp. 110-114, 134-136. May, 1929.—Logging waste in the Douglas fir region, by A. H. Hodgson, supplement, pp. 1-4.
- Proceedings of the American Society of Civil Engineers, April, 1929.—The surveying and mapping activities of the Federal Government, by T. W. Norcross, pp. 877-886.
- Quarterly Journal of Forestry (London), April, 1929.—Afforestation and unemployment, by A. D. Hopkinson, pp. 118-130.
- Tropical Woods, June, 1929.—Walnut woods, true and false, by S. J. Record, pp. 4-29.
- West Coast Lumberman, May, 1929.—Review of Pacific coast lumber industry in 1928, pp. 37-56, 148.

Recent Publications of the Forest Service

- Department Bulletin 1136, Kiln Drying Handbook.
- Circular 62, Utilization of Browse Forage as Summer Range for Cattle.
- Leaflets: 32, Planting Southern Pine; 35, Producing Pine Nursery Stock in the South; 40, Woods Burning in the South; 41, Good Naval Stores Practice.
- National Forest Map Folder, Superior.
- Forest Service Directory.
- National Forest Administrative Maps: $\frac{1}{2}$ -inch, Klamath, Eldorado, Boise; $\frac{1}{4}$ -inch, Santa Fe, Eldorado, Boise.
- Contour map (prepared in cooperation with the National Park Service), $\frac{1}{2}$ -inch, Glacier National Park, with parts of the Blackfeet, Flathead, and Lewis and Clark National Forests.